

Overseas

LIBYAN ARAB REPUBLIC

UNIVERSITY OF TRIPOLI

**LECTURER
ASSISTANT PROFESSOR
ASSOCIATED PROFESSOR
PROFESSOR**

Applications are invited for positions to teach fundamentals of Computer Science to undergraduates, mainly. Preference will be given to people specialised in one or more of the following fields:

**Data Processing
Data Structures
Languages**

**Information Systems
Programming
Operating Systems**

Applicants should have a Ph.D. in Computer Science or related fields. Preference will be given to applicants with teaching experience.

Salary (Libyan Dinars)	From	To
Lecturer	3200	4600
Assistant Professor	3800	5000
Associated Professor	4200	5520
Professor	4800	5920

Allowances (Libyan Dinars)

Accommodation	Furniture
Married 1200	2 Months' Salary
Single 840	1 Month's Salary

(1 Libyan Dinar = £1.80 App.)

Applications to be sent to the following address not later than 30th March, 1978.

Head of Mathematics & Science Department
University of Tripoli, P.O. Box 688,
Tripoli, Libyan Arab Republic

The British Council
invites applications for the following post:

Head of Pre-Preparatory Department (Brazil)
British School, Rio de Janeiro
Independent co-educational IAPS School with 325 pupils aged 3-16. Qualified teacher with at least 4 years relevant experience.
Salary: £4,300 p.a.
Benefits: free furnished flat; medical scheme; superannuation paid. Two-year contract, renewable.
76 US 2

Head of Mathematics Department (Brazil)
British School, Rio de Janeiro
Independent co-educational IAPS School with 325 pupils aged 3-16. Qualified teacher with relevant experience.
Salary: £4,300 p.a.
Benefits: free furnished flat; medical scheme; superannuation paid. Two-year contract, renewable.
76 US 3

English Language Teaching Assistants (Soviet Union)
For universities and institutes
Degree in English or modern languages with relevant teaching experience. Knowledge of Russian highly desirable.
Salary: 225 roubles per month (at present 1.56 roubles = £1) tax free, non-convertible. Sterling subsidy of £1,767 p.a. paid in Britain.
Benefits: subsidised accommodation; employers' contribution to superannuation. Contract for one academic year (10 months).
76 SU 7-16

Return fares are paid. Local contracts are guaranteed by the British Council.

Please write, briefly stating qualifications and length of appropriate experience; quoting relevant referees' number for further details; and an application form to The British Council (Applications), 65 Davies Street, London, W1V 2AA.

Printed and Published by the Times Newspapers Limited, 1, Abchurch Lane, London, E.C. 4N 3DF. Registered in England. No. 1077. Registered in New York, N.Y. as Second Class Matter 658, dated May 19, 1964.

STATE OF KUWAIT—KUWAIT UNIVERSITY

Applications are invited for the posts of Instructors to teach English foundation courses and communication skills to freshman and sophomore students for the academic year, 1978-79.

Qualifications required are:

- 1. NATIVE SPEAKERS OF ENGLISH**
 - (a) B.A. in English or Humanities.
 - (b) M.A. or diploma in TEFL or Applied Linguistics.
 - (c) At least three years of TEFL (for holders of M.A. degree) or five years (for holders of diploma) at secondary or tertiary levels, preferably to students of science.
- 2. NON-NATIVE SPEAKERS OF ENGLISH**
 - (a) B.A. 1st or 2nd class honours in English, preferably from a British or an American university.
 - (b) M.A. in TEFL or Applied Linguistics.
 - (c) At least five years of TEFL teaching at secondary or tertiary levels, preferably to students of Science.

Annual return on tickets to the candidate's country of permanent residence will be provided for him. His wife and three of his children not exceeding the age of 20.

(d) Minimum monthly total salary will be approximately K.D.310/- for a single person and about K.D.360/- for a married person. Free university accommodation will not be provided.

Application and curriculum vitae forms are obtainable from Kuwait Embassies in Washington D.C. (4301 Connecticut Avenue, N.W., Suite 100, Washington D.C. 20014); London (Cultural Attaché's Office, Al-Jahra House, 3 Stratford Place, London W1N 8AB); Cairo and Damascus, or from Kuwait University, Kuwait. Completed application forms, together with unexpired copies of testimonials and past experience certificates duly attested must be received by the University not later than 15th February, 1978.

Colleges of Higher Education

Bulmershe College of Higher Education

Applicants with a strong interest in new developments in higher education are required for September, 1978:

TUTOR IN FRENCH STUDIES

to contribute to the B.Ed. Honours programme and to assist in the development of other Higher education courses.

TUTOR IN CONTEMPORARY EUROPEAN HISTORY

with a strong interest in political theory to contribute to undergraduate courses.

TEMPORARY TUTOR IN ENGLISH LITERATURE

to contribute to the undergraduate programme. All the above appointments will be at the level of Lecturer II.

TWO TUTORS IN SOCIAL AND COMMUNITY STUDIES

Applicants will be expected to make a major contribution to the College's course in Community and Youth Work, which has a strongly student-centred curriculum. In addition, they will be expected to participate in the development of the College's undergraduate programme. Candidates should preferably have a degree in Social Science and a Certificate of Qualification in Social Work. A suitable, qualified, and experienced candidate may be appointed as Senior Lecturer level.

SENIOR LECTURER IN ORGANIZATIONAL BEHAVIOUR

Applicants should have an appropriate higher degree and administrative or managerial experience. They will be expected to contribute to programmes including studies in Organizational Behaviour at post-experience and undergraduate levels.

SENIOR OR PRINCIPAL LECTURER IN APPLIED SOCIAL STUDIES

Applicants should have had experience of teaching in higher education, and have appropriate academic qualifications and experience. They will be expected to play a major part in the establishment of a new B.A. programme in Applied Social Studies.

Further particulars and application forms may be obtained from the Academic Registrar (L2), Bulmershe College of Higher Education, Bulmershe Court, Woodlands Avenue, Reading RG6 2HY. (Tel: Reading (0734) 993387). Completed forms should be returned by Monday, 18th February, 1978.

General Vacancies

London

Wanted

Masters of Science

Masters of Science

Masters of Science

Masters of Science

Masters of Science

Masters of Science

Masters of Science

Masters of Science

Masters of Science

Masters of Science

Masters of Science

Masters of Science

Masters of Science

Colleges of Higher Education continued

London Borough of Ealing Education Committee

COLLEGE OF HIGHER EDUCATION

DIRECTOR-DESIGNATE

Applications are invited for the post of Director-Designate of a new establishment of higher education to be formed in September, 1977, by the reorganisation of Ealing Technical College and Thomas Huxley College of Education. The Burnham grading of the new establishment will be Group 9 and it is expected that the successful candidate will take up the appointment by September, 1978.

Candidates should possess qualifications and experience appropriate to this important post. Further particulars are available from the Chief Education Officer, London Borough of Ealing, Hadley House, 79-81 Uxbridge Road, London W5 5SU, to whom letters of application should be sent so as to arrive not later than 1 March, 1978.

Colleges of Education

CUMBRIA

EDUCATION COMMITTEE

CHARLOTTE MASON COLLEGE

Principal, Education

Required for one year from September 1978, a person with a degree in Education, and a minimum of five years' experience in the post of Principal, Education, in a secondary school or college, to take over the post of the retiring Principal, Education, who is retiring in September 1978.

The successful candidate will be responsible for the overall management of the College, and will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

The successful candidate will be expected to contribute to the development of the College's undergraduate programme.

News in brief

Some may enter without A-levels

Lancaster University senate has agreed in principle to the admission of some students without A levels. Instead, students will take courses at Nelson and Colne College of Further Education or Preston Polytechnic and then come into the university on a special course to qualify for a BA.

Lancaster University might have a small financial surplus for the end of the present year. The university's estimate of the rate of inflation might prove to have been too high if the Government's anti-inflation policy holds.

On with the dance

The Gulbenkian Foundation has launched inquiries into the training of musicians and dancers. Mr. John Veizey, professor of economics at Brunel University, is chairing the musicians' committee. Mr. Peter Brinson, director of the Gulbenkian Foundation, is chairing the committee inquiring into dancers' training. Both are expected to report by the beginning of next year.

5 join job-match scheme

All five polytechnics in the Inner London Education Authority have joined the nationwide careers scheme to match jobs to students. The computer assisted scheme includes a special "follow up" system to monitor the destination of students after they complete their courses.

A full range of career services is also being offered to five further education colleges in the ILERA area and is soon to be introduced to seven others in London.

Hull residents

The proportion of students in residence at Hull University was not as reported in *The Times* on December 12. The correct figure for the year concerned was approximately 66 per cent.

Conference of the Association of Colleges Implementing DipHe courses

Robinson attacks universities for sponsoring 'inferior' courses

A "whitelist" of the best courses would be one way to raise standards, the Association of Colleges Implementing Diploma of Higher Education courses was told last week.

Urging the ACI's first annual conference to introduce such a list, Mr. Eric Robinson, principal of Bradford College, said the association needed to be bold and reject the label "second best" which was in danger of attending the birth of the DipHe.

He said the association should promote courses which were establishing the diploma as an innovation. "Part degrees and imitation degrees will not do and cannot be a successful base for its establishment."

"The worst offenders in this area are some universities which are taking the diploma course, ignoring the national guidelines agreed by the Committee of Vice-Chancellors and Principals, the Council for

National Academic Awards, the Open University and the Department of Education and Science, and thereby sponsoring inferior courses. "For all their talk of standards and excellence it is the universities, not the colleges or polytechnics, which are currently debasing the currency of higher education."

Mr. Robinson said the coherence of courses was the major test the CNA applied to proposals. Many colleges were failing this test because their courses were not perceived by students and the outside world as meaningful, and ordered, with particular objectives.

He rejected the idea that the DipHe could not realistically be thought part of a valid degree programme. "I believe the reverse, because so many degree courses do not constitute three years of a coherent progression of work."

Two A-level entry still favoured

The two A level qualifications would have to be the normal entry standard for DipHe courses until they were well established, Mr. Fowler, Minister of State for Higher Education, told the conference.

He warned that economic restraints, the incompatibility of the diploma with other qualifications and the attitudes of employers made this inevitable.

"Whether we like it or not the diploma has to establish itself as something better from the employer's point of view than an existing public standard—namely two A levels. Without this as a general admission level employers may not necessarily be better educated than those with two A levels; two A level entry may be seen by many

employers as a sheet anchor. "Some percentage of college intake might well be available to those with no A levels, entry being at the discretion of the admitting institution."

"The wisest and safest course may therefore be to see the DipHe well established, and then consider, in the light of whatever resources may be available, whether admission arrangements can be more flexible, thereby enlarging the field of recruitment, and almost certainly, increasing the cost."

Mr. Fowler did promise ACI that the DES would launch a publicity campaign to back the colleges running DipHe courses. "I hope we may look to the association for particularly welcome suggestions about the form, direction and

"Why should the initiative be left to the so-called 'Independent University' to demonstrate the feasibility of a two-year degree by a combination of hard work and intelligent planning when the colleges and polytechnics of the public sector are so much better qualified and equipped to do the job?"

Mr. Robinson attacked present degree standards. A degree from a British university was "a certificate of moderate success in the sixth form and three years subsequent behaviour and performance satisfactory to lecturers and professors."

The diploma had given colleges a golden opportunity to relax traditional entry standards. "We should be bold. We know that many people with two A levels have less apparent ability and motivation than those with two A levels. We should have the confidence to act on the basis of this knowledge."

timely publicity might take", he said.

The rapid growth of DipHes from two to 63 in two years had led to four major groups of courses, Mr. David Hencke of *The Times* told the conference.

On one, students on teacher training courses and other degrees could leave after two years of a degree course with a qualification.

Chiefly in colleges of education and higher education, the years of Bachelor of Education degree courses enabled students to transfer to other liberal arts courses.

Broad-based combined studies courses, involving the liberal arts, social sciences and technology.

Independent courses where students were judged on their competence and skill rather than factual knowledge.

Local councils 'still have major role'

by David Walker

The 20 year old plumber colony qualification at a further education college seemed to attract attention as a student on a course, Sir Toby Weaver, deputy secretary at the Department of Education, said last week.

The word "higher education" had been used by the hierarchy of the hearts of students, teachers, administrators alike.

Sir Toby was addressing a seminar organized by the Chartered Institute of Public Finance and Accountancy on the development of the diploma.

He reassured CIPFA members that local government was not the major role in higher education, dismissed the idea that authorities were simply offices between the DES and polytechnics as a dangerous point of view, discussed the future of post-18 education.

However, the seminar at the Institute of Public Finance and Accountancy, presided by Mr. W. Davey, president of Portsmouth Polytechnic, pleaded for the role of a "strong individual" in institutions.

He blamed the system of government by committee for the lack of clear cut decision making in education. "We are paying more and more each year to committees to make decisions, often believing they are doing this."

Dr. Davey argued that aspects of further education need close scrutiny: student fees, dogmas of autonomy and academic freedom, the cost of running a Council for National Academic Awards, and the balance between degree and non degree work at polytechnics.

There was a clear need for polytechnics to release and re-assess and retained.

Designers support communication studies course

Widespread support for a new course of design, communication studies, emerged at a conference organized by the Society of Industrial Artists.

Disagreement among the designers from 23 arts and crafts polytechnics centred on the detail of course control, not on the main proposition, set out by the society's graphic group.

The society presented a new, integrated course in communication which emphasized the ability to convey information in the appropriate medium, a broad range of training, including sound and image (but leading to specialization in one area), and knowledge of principles of communication.

Mr. Hugh announced an exchange scheme between Edinburgh University and the University of Pennsylvania involving exchanges at all levels.

Education Councils, which would be set up with the proposed Further Education Advisory Councils in the Regions (FEACs), might appoint officials with specific responsibility for liaison with the councils.

On whether the interim regional committees on teacher training, proposed by the Advisory Committee, should be set up as soon as possible or await implementation of CLEA, the AVPTI says neither alternative is satisfactory. The FEACs would be the second implication of acceptance of it.

The association does not propose a national council overseeing both sectors of education—the degree and further education, including the proposed FEACs.

The AVPTI does propose, however, that bodies such as the CNA and the Business and Technology

Despite financial setbacks, the University Press managed to produce some notable academic titles last year during the year of its publishing department.

The delegates of the press in the university of the press in 1974-75 that OUP had to borrow money to avoid a sharp cutback in its publishing. They warned that the den of interest rates would be higher earnings in future.

'SRC blocks grants for multinational projects'

by David Dickson

The Science Research Council has been criticized for allegedly discriminating against university departments which collaborate with multinational companies on research projects.

The allegations have been made to the science subcommittee of the House of Commons Select Committee on Science and Technology, by Mr. Dennis Taylor, managing director of the Hewlett-Packard Corporation, the United States-based electronics company.

Giving evidence last week to the subcommittee, which is at present investigating the financing of scientific research in British universities, Mr. Taylor said that the company had been discriminated against by the SRC. The council had taken the view "that it is not a good thing for universities to work with us", he claimed.

Mr. Robert Coackley, research and development manager at the company's South Queensferry base outside Edinburgh, said that he had written to the SRC last October requesting information about its attitude to multinational companies, but had not received a reply.

However, he had been told independently that a Scottish university's grant application was refused by the SRC partly because it was collaborating with an American multinational company, namely Hewlett-Packard.

He added that the department concerned had subsequently been awarded a reduced grant, and that the research had been carried out with additional financial support from the company.

Mr. Taylor said the subcommittee should be completely self-sufficient in its operation, receiving no financial injection from the United States, and not "repatriating" any of its profits.

He agreed that the SRC might have been concerned that the product of any research carried out in collaboration with the company might subsequently be developed and manufactured elsewhere.

Mr. Taylor said that in general the company's relations with university departments was good. However, he did not feel that the Confederation of British Industry provided good inputs and direction in enabling companies to work with universities.

Telescope may be sited in the Canaries

The Science Research Council is negotiating with the Spanish Government for a site in the Canary Islands for a new 10m telescope.

A new large optical telescope, probably about 4.2 metres in diameter—would be constructed and the observatory would include two smaller telescopes.

One would be the 2.5 metre Isaac Newton telescope, to be moved from the Royal Greenwich Observatory at Herstmonceux, Sussex. The other would be a smaller one metre telescope for astrometry and photometry.

The Isaac Newton telescope, the largest in the country, can only be used about one night in every three because of poor British weather conditions.

The new site at La Palma was chosen after a three-year investigation into several locations in Hawaii, Mexico, and the Canary Islands by an international team of astronomers.

Professor Graham Smith, director of the RGO, said this week that an observatory was particularly necessary for extra-galactic optical research in the northern hemisphere.

A new northern hemisphere observatory would complement the southern hemisphere Anglo-Australian telescope in New South Wales, opened in 1974.

It is not yet known whether this project will be affected by the expected SRC cutbacks.

Generous donor gives again

Imperial College, London, has been given £250,000 for an extension to its main residence by an anonymous donor. It is understood to be the same person who has given over £250,000 for London University's main residence last year.

Journals in danger—libraries

Library spending cuts are threatening some science and technology journals with extinction.

The Library Association made this claim in its evidence to the science subcommittee of the Select Committee on Science and Technology, which published its second interim report last week.

Library budgets are caught between escalating costs of journals and cuts in public expenditure. In real terms, the funds available for journal buying are down, leading inevitably to cancellation of subscriptions and overreliance on the national interlending system", it said.

A survey of journal expenditure by 44 universities had shown that they spent 13.7 per cent more in 1974-75 than in the previous year, while prices rose on average 10.2 per cent. Between 1970 and 1975, science and technology journals increased in price by 113.1 per cent. The cost of 13 leading journals in astronomy and physics went up by 186.4 per cent; 29 in nuclear science and technology by 144.1 per cent; 42 in mathematics and statistics by 139.2 per cent and 22 in biophysics, biochemistry, and microbiology by 151.8 per cent.

"University libraries have struggled to keep abreast of these price increases partly by increasing the proportion of the total library expenditure which is allocated to journal purchase. In a sample of 14 universities, the proportion of total library expenditure on journals increased from 13.9 per cent in 1967-68 to 17.5 per cent in 1974-75. However, this proportionate increase must have a limit, when costs in other sectors of the library budget are increasing similarly and the total budget is likely to decrease in real terms."

"It seems inevitable that some worthwhile journals will go to the wall in the near future."

Graduates who leave Britain to work in wealthier countries for higher salaries were attacked this week by Dr. Morris Stockwood, the Bishop of Southwark.

He told graduates at South Bank Polytechnic's annual presentation ceremony: "One would have hoped that having received so much from this country, they would remain here to contribute to its welfare, or go to less fortunate countries, where their services are so much in demand."

Privileges must be matched by responsibilities, he said. But the country's need for graduates to repay their debt by providing jobs.

"We cannot afford to waste their brains. Still less can we allow them to become demoralized. For people at every level unemployment is a terrible scourge but perhaps it is particularly painful for those who have worked so hard, who have disciplined, versatile and critical

British should also consider carefully the contribution it could make to the Third World by educating overseas students. Foreign students who could afford to pay should do so, but if they could not, their education should be seen as a contribution to the development of their countries."

He urged a close look at curricula, particularly in the universities, polytechnics, and colleges of education, if the educational system was not to become entirely utilitarian.

Other speakers included Mr. Vivien Pereira-Mendoza, director of the polytechnic, who drew attention to groups of students graduating for the first time with degrees in business studies, and with diplomas in health education, and health visit

ing.

The THES in 1976

We regret that the price of *The Times Higher Education Supplement* is increased this week to 15p. It is the first increase for a year and we hope that our readers will agree that at 15p the paper is still good value. Our production costs have increased substantially during the past 12 months but only about a third of our revenue comes from the cover price.

Among the features in 1976 will be:

- An eight-part series on the new universities by Peter Wilby.
- Another 21 inserts on books in arts, science, technology, and social sciences.
- Special articles on the polytechnics by one of Britain's most distinguished journalists.
- Special coverage of the AUT referendum on affiliation to the TUC.
- Our new North America page by Michael Birtyn.

Apart from our normal service of news features and book reviews, there will be more articles on the content of higher education and on aspects of British culture—as well as our continuing selection of academic jobs.

The average circulation of *The Times Higher Education Supplement* is more than 20,000 copies a week.

Better career pattern urged for scientists

by John Ross

A career structure for postdoctoral scientists should be established by the Science Research Council, a recent report by the Standing Conference of University Professors of Physics recommends.

The report, which was submitted as evidence to the Select Committee on Science and Technology, has also been sent to the SRC and to the University Grants Committee.

It says: "There is need for research officers with the expectation of more than a few years support. A first-class performer who has reached the age of 30 support by research grants may legitimately worry about where he will finish up and this is proving a deterrent to young physicists with the ability to make essential contributions."

The holders of these posts could be sent to any university where their skill was in demand, the report suggests. Furthermore research projects which could be undertaken within universities should not be initiated within existing research establishments, "even if this entails redeploying manpower."

Also staff in research establishments should be available for secondment to universities where this would provide "better scope for their talents."

The report stresses the importance of university research to the economy.

It calls for greater cooperation between universities and polytechnics in sharing expensive scientific resources.

Special efforts should be made to improve recruitment into science with incentives for experienced scientists to take up school teaching.

More consideration should be given to sifting major general facilities of university campuses, where possible.

Senior academics should concern themselves more with the distribution of resources within their own universities, where this entails dividing up the work of the university.

The present quota system for allocating research studentships should be retained, but more attention should be given to the quality of students and research schools.

Report maps out OU's role in 'continuing education'

by Frances Gibb

The Open University has been recommended to move into sub-degree work in collaboration with other educational institutions by the interim report of the Venables committee on continuing education, published this week.

There might be reservations about whether a university was the right institution to make such a contribution, the committee said, but one of the aims in its charter was to provide for the well-being of the community generally. That did not limit the Open University to a stereotyped image of a traditional university where sub-degree work might be precluded.

The committee, chaired by Sir Peter Venables, former professor of the Open University and a member of the Government planning committee on its establishment, was set up last May to look into the contribution the Open University could make to continuing education and suggest a programme of action. It has now received 130 submissions of evidence.

The keyword of the report was collaboration. Whatever contribution the university made, it could only be partial, it said. The Open University could not become involved in the whole range of adult education and should not try to do so.

Collaboration with other institutions could take many forms, partnership with both institutions creating and providing courses and materials; an agency arrangement, where the Open University, alone or with others, provided and distributed materials or validated courses.

The committee outlined the possible work of the Open University in continuing education: providing courses of relevance and concern to adults; courses based on interests stimulated by the BBC and other providers of adult education; new courses for diplomas and certificates; courses linked to particular jobs; refresher courses; more degree and higher degree work.

A clear demand for qualifications at sub-degree level had emerged from the submitted evidence. This must lead to a reappraisal of the conventional image of a university so far as its contribution to continuing education is concerned.

Report, page 9

Approach to college reorganization 'scandalous'

The reorganization of teacher training by the Department of Education and Science was condemned at the weekend by Dr. Keith Hampson, secretary of the Parliamentary Conservative Education Committee, as "a hasty, botched up operation that is a tragedy."

"Never has there been such frustration, anxiety and such low morale in our teacher training institutions as now," he told a public meeting in Ilkley, Yorkshire.

"Many criticisms have been made of the Government's failure to live up to their rhetoric, but almost totally neglected has been their approach to the former colleges of education. The disorder here is nothing short of scandalous."

Dr. Hampson said that the colleges had made heroic efforts in the 1960s to triple the supply of teachers. They had now been treated ably.

Two years ago there had been 130,000 teacher training places but by 1981 there would be only 60,000, not less. In short, by the mid-1980s the country looks like training no more than 45,000 teachers, the total we were training in the early 1960s.

No account was taken in the reorganization of colleges of the relative quality of departments or of the need for selective treatment of subjects: there was no quality control.

For two decades teacher training will have been in perpetual turmoil. This cannot be good for the quality of the system, which produces the most vital resource in education—the teachers.

The "teacher question" has amounted to a full scale reorganization of the system, totally restructuring the way in which we train our teachers, leaving colleges virtually conducted in secret.

A local authority squabble over the number of councillors entitled to represent a college of education is delaying a decision on whether Dudley College of Education should merge with two Wolverhampton teacher training colleges and Wolverhampton Polytechnic.

Wolverhampton and Dudley education authorities are quarrelling over the terms of a letter from the DES which proposed a joint education committee or informal machinery giving Dudley education authority some representation in the new institution.

Unemployment among newly qualified teachers in Wales is rising rapidly according to a survey by the National Union of Students (Wales).

A survey of four teacher training institutions in Wales shows that between 1974 and 1975 the percentage of students leaving colleges last year could not get jobs.

DES asks for cuts in trainee teacher intake

by David Hencke

University education departments have been asked by the Department of Education and Science to consider reducing their recruitment of arts graduates to postgraduate certificate of education courses.

Mr. Hugh Harding, deputy secretary at the DES responsible for the reorganization of teacher training, approached the Universities Council for the Education of Teachers with the proposal at the end of last year.

The proposal, which can be implemented only with the universities' consent, is the first attempt by the department to limit teacher training courses outside polytechnics and colleges. It is likely to be resisted by the universities.

The department is understood to be anxious about the oversupply of arts graduates in the teaching profession and thinks that control over recruitment to university education departments would redress the balance between arts and science students.

Figures supplied by the Graduate Teacher Training Registry show that although recruitment rose by 4 per cent to university education departments last year, the increase was wholly due to arts and social science graduates. The number of admissions to mathematics and science courses actually fell.

UCET has told the DES that in spite of rising unemployment among postgraduates obtained jobs and that it would be better to recruit highly qualified graduates in non-science subjects because of difficulties in matching supply to demand.

A local authority squabble over the number of councillors entitled to represent a college of education is delaying a decision on whether Dudley College of Education should merge with two Wolverhampton teacher training colleges and Wolverhampton Polytechnic.

Wolverhampton and Dudley education authorities are quarrelling over the terms of a letter from the DES which proposed a joint education committee or informal machinery giving Dudley education authority some representation in the new institution.

Unemployment among newly qualified teachers in Wales is rising rapidly according to a survey by the National Union of Students (Wales).

A survey of four teacher training institutions in Wales shows that between 1974 and 1975 the percentage of students leaving colleges last year could not get jobs.

Unemployment among newly qualified teachers in Wales is rising rapidly according to a survey by the National Union of Students (Wales).

A survey of four teacher training institutions in Wales shows that between 1974 and 1975 the percentage of students leaving colleges last year could not get jobs.

Unemployment among newly qualified teachers in Wales is rising rapidly according to a survey by the National Union of Students (Wales).

A survey of four teacher training institutions in Wales shows that between 1974 and 1975 the percentage of students leaving colleges last year could not get jobs.



Thomson give you a run for your money!

Better choice of resorts

This season we've included France and Italy as well as Austria, Switzerland and Spain to give you a full list of resorts to choose from.

We offer you the widest range of ski packs, more options for food and breakfast or half board and both airport taxes and comprehensive insurance included in all prices.

Worry you from 4 airports: Luton, Gatwick, Heathrow and Manchester.

You'll find our brochure has detailed resort and hotel information and every holiday is sealed with the total reassurance of the Thomson Fair Trading Charter.

Get your copy from your travel agent quickly, or ring us direct on 01-388 2001 (London departures) and 061-833 0911 (Manchester departures).

Thomson Wintersports Holidays

We take the care. You're free to enjoy yourself.

Wholesalers and Retailers: Thomson Holidays Ltd., 100, Abchurch Lane, London EC4N 3DF.

Fewer public schoolboys in Oxford's intake

by David Walker

Oxford's undergraduate intake in 1975 contained fewer public school pupils than before, according to figures published last week in the university Gazette.

Just over half Oxford's women came from English state schools, against 43 per cent from public and direct grant schools, reversing the average figures for 1968-74. Among men, public school and direct grant entrants still outnumber those from state schools but the gap is narrowing. Last year Oxford accepted just over 37 per cent of its intake from public schools compared with 40 per cent for the years 1965-74. Its number of direct grant entrants remained constant at 17 per cent.

By contrast, a survey of candidates for all universities in 1971-2 showed that about a fifth of those accepted came from the English direct grant and public schools.

Despite these changes, some aspects of the traditional Oxford pattern remained intact. For example, nearly half Oxford's undergraduates in 1975 were recruited from London and the south-east regions. No students from Scottish schools were accepted last year. The quality of Oxford students

A-levels remain high. Nearly two-thirds averaged at least two "A" grades and a "C". A survey of all candidates applying through the Universities Central Council on Admissions in 1974 showed that only a quarter got such high results.

Of the women accepted at Oxford last year, 30 per cent got at least three "A" grades while only a quarter of the men did as well. In the general UCCA sample, only 8 per cent achieved this standard.

Another traditional pattern held good in the examination boards through which the Oxford men passed. Oxford and Cambridge Board handled nearly half of the men accepted and Cambridge Local and Oxford Local together accounted for another fifth. For university candidates as a whole London and the Joint Matriculation Boards dominated.

Roughly equal numbers of men were accepted for arts and sciences subjects and about half—400—went into law and philosophy and the social sciences.

The women were more arts biased. Over 350 went into arts subjects compared with 220 in the sciences and just over 100 in the law and social science fields.

High hopes for NHS royal commission

Dr David Owen, Minister of State in the Department of Health and Social Security, said this week he hoped that the Royal Commission on the Health Service, chaired by Sir Alec Morrison, would be to medicine what the Robbins report had been to education.

Talking in London to the Association of British Science Writers, Dr Owen said he believed that medical education held the key to better priorities in the health service.

There would have to be new educational programmes to produce specialists willing to tackle neglected areas such as backache, neglected ageing and hearing problems. But he rejected the idea that the DHSS should directly fund the medical schools.

His problem was to find resources for the clinical services demanded by medical schools provided by the University Grants Committee. He did not believe that higher education was yet affording drastically from the economic situation.

Dr Owen produced figures to show that spending on glamorous medical specialisms was substantially greater than spending on less exciting topics.

Although he believed that social priorities and medicine must change and that the Rothschild principle for funding Government research was essentially correct, he was utterly against fusing the Medical Research Council and the DHSS.

Imperial College report shows £186,179 deficit

by John Ross

Imperial College, London had a deficit of £186,179 for 1974/75, its annual report, published this week, revealed.

The report cited salary increases and threshold payments for non-academic staff as the principal cause of overspending: the cost was £1,200,000—£800,000 more than estimated.

Plans to develop life sciences, computing sciences and interdisciplinary studies in energy, the environment, polymer science and technology were shelved as an economy measure.

A general 2 per cent cut in expenditure during 1974/75 was followed by a further 2 per cent cut at the start of 1975/76 and the college has increased charges for overheads on industrial contracts.

Direct expenditure on sponsored research reached £3,339,614—an increase of £714,005 from 1973/74. The College came from the Science Research Council.

The college showed losses on halls of residence and refectories of £60,433 and £66,730 respectively. In future it will review hall fees and refectory prices.

The number of undergraduates declined for the first time since 1960. There were 2,539 undergraduates (about 3 per cent fewer than in 1973/74) out of a total of 4,060.

Postgraduate numbers also decreased slightly. Overseas student numbers continued to rise, at 1,028 they constitute 25.3 per cent of all students and 49.2 per cent of the postgraduates.

One bright spot, the report said, was that the number of women students increased to 412, or 10.1 per cent of the student total.

The report continued: "Inadequate command of English by overseas students continues to be a mat-

ter of serious concern, not only for Imperial College but for British universities generally.

The college had been considering remedial classes in English for students, but this was shelved as a factory, particularly for one-year courses. The college therefore introduced a test for those as part of the application process.

The college set up a working party during the year. One on environmental studies had rejected the idea of a degree in environmental studies. Such work should be included in existing science and engineering courses, it had said.

The working party on postgraduate studies had been dealing with a field. The group dealing with academic relationships with industry had recommended an award in the teaching of European languages.

Imperial College has been criticised by the Committee of University Teachers and the Association of University Teachers for its group report on postgraduate studies.

A working party, set up last year to examine the CVC report, concluded: "The report is in what is disappointing. The arguments are set out quite well but the need because it is not enough any serious consideration of its proposals must be made."

The report paid insufficient attention to the "rigidities of the structure affecting research" and made no reference to the value of postgraduate self-development. The report, too much at the performance of students and not enough at the staff.

Exposed

The duplicated letter with which the editor of *The THES* wooed potential contributors to "Don's Diary" states that "it is one of the most popular features of the paper and is widely read." As a compulsive reader of "Don's Diary" and "miscellaneous" in newspapers and magazines I can only credit the assertion. But why the compulsion? Why do so many of us, apparently, turn so eagerly to that part of a journal which is likely to be the most trivial and ephemeral in content?

For the same reason, I suspect, as we turn to that other unfailingly popular section of any journal, the letters page: in the hope of finding there some naked human authenticity unprotected by the conventions of writing—in the fashion of a French jargon, *à la carte*.

Always, of course, writing always conceals at least as much as it reveals, and never more, paradoxically, than when it appears to be most confessional.

The professional columnist who is so daringly unbuttoned now says (a lady columnist commenced her diary in one of the posh papers recently: "Monday: stayed at home this evening and shaved public hair") are projecting personas as artificial as those of *Spectator* and *Observer* writers who started it all nearly three centuries ago. The "amateurs" who contribute to such a column as this are perhaps more prone to unconscious self-betrayal, but what we betray is what we wish to be thought of, not what we are.

In the life of even the most disciplined and dedicated academic there must be days of idleness and dereliction of duty, but it would be a stunning surprise to find one in *Don's Diary*. "Monday: Intended to rise early to prepare today's teaching but stayed up late last night watching *Travis* film on TV and overslept in consequence. No time for breakfast, let alone preparation. Bluffed my way through tutorial at 10.11.12, coffee and gossip in Common Room."

"Bluffed my way through seminar at 12. Drank too many beers at lunch and fell asleep in chair afterwards. Late for lecture at 3. Stumbled through old dog-eared notes, almost as bored as students. Drove home with splitting headache, kicked dog and quarrelled with wife."

Somewhat one can not imagine it in *The THES*, though I dare say that in a campus novel it would not seem wildly improbable.

The fact is (I belatedly recognized) that unless one is very far down the salary scale indeed, the principal motive for writing a "Don's Diary" must be vanity, so that even self-deprecation becomes a covert bid for applause. The most characteristic stylistic feature of the genre—the omission of the personal pronoun—is a desperate but doomed attempt to disguise the essential egotism of the whole enterprise. With this discouraging reflection, I proceed as best I can.

Other new courses include: chers' diplomas, certificate education courses, in-service degrees and postgraduate certificate of education courses.

Three Scottish colleges—Dunfermline, Dundee, and Dundee—offer BEd degrees. Ulster College offers a BEd degree and a year-long ordinary Bachelor of Education and four-year honours courses which have been approved in 1974 and 1975. A further 12 are expected to be approved to start in 1976.

A total of 33 colleges, polytechnics or groups of institutions share 59 courses. There are 18 new three-year ordinary Bachelor of Education and four-year honours courses which have been approved in 1974 and 1975. A further 12 are expected to be approved to start in 1976.

The full list is as follows:

Notre Dame College, Glasgow BEd in-service
Sunderland Polytechnic Diploma (Teacher Counsellors)
Ulster College BEd (Hons) in-service
Dunfermline College, Edinburgh BEd (Hons)
North-East London Polytechnic BEd in-service
PGCE, BEd

Hertfordshire Colleges (Balls Park, Hatfield Poly, Hemel Hempstead, Wall Hall) BEd (Hons) in-service
Kingston Polytechnic BEd (Hons)/CertEd
Manchester Polytechnic BEd (Hons) in-service
PGCE

Plymouth Polytechnic Diploma (Ed Tech)
Garnett College BEd (Hons) in-service
Didbury College BEd (Hons) in-service
PGCE

Bulmer College BEd (Hons) in-service
West Midlands College BEd (Hons)/CertEd
PGCE

Bognor Regis College BEd in-service
Dorchester College BEd (Hons) in-service
PGCE

Nottingham College BEd (Hons) in-service
Birmingham Polytechnic BEd (Hons) in-service
PGCE

King Alfred's College Diploma (MA)
Northern Colleges Diploma (Curriculum)
PGCE

Northampton College BEd (Hons)/CertEd
PGCE

Crewe & Alsager College BEd (Hons)/CertEd
PGCE

Nottingham College BEd (Hons) in-service
PGCE

Nottingham College BEd (Hons) in-service
PGCE

Nottingham College BEd (Hons) in-service
PGCE

Nottingham College BEd (Hons) in-service
PGCE

Nottingham College BEd (Hons) in-service
PGCE

Nottingham College BEd (Hons) in-service
PGCE

Nottingham College BEd (Hons) in-service
PGCE

Nottingham College BEd (Hons) in-service
PGCE

Nottingham College BEd (Hons) in-service
PGCE

Nottingham College BEd (Hons) in-service
PGCE

Don's diary

very little redundancy: if you attention wanders and you miss one condition clause you are immediately lost in the maze of scruple and motive.

I suspect that the sheer volume of books that an English don is expected to hold forth about in any given week is peculiar to our subject. In one sense it is absurd; in another it is intellectually stimulating to be obliged to keep the canon of English literature rotating before one's eyes rather than filed away on the dusty shelves of fading memory.

Teacher's test

Perhaps because of my long break—summer vacation plus study leave—I feel more than usually self-conscious of the complexity of the processes involved in small-group teaching, especially the small seminar of about a dozen students, of which I happen to be taking several at the moment.

Henry James describes Fleda Vetch, the supersensitive heroine of *The Spoils of Poynton*, as "a person who could think 10 thoughts at once," and it seems to me that the ideal teacher ought to be similarly endowed. For one must try simultaneously to (1) learn and remember the students' names, (2) encourage them all to participate, (3) prevent any one person from dominating the discussion, (4) correct error, (5) avoid humiliating anyone, (6) make the discussion sufficiently structured for the participants to feel that they are wiser at the end of the hour than they were at the beginning, (7) follow up interesting insights if they seem valuable, (8) express one's own spontaneous views, (9) avoid turning the seminar into a lecture, (10) pace the discussion so that it does not peak too early or too late.

These desiderata can be divided into two categories—the social and the intellectual; and there is often a conflict of interest between them. The ideal tutorial or seminar would, I suppose, be one in which the clash of opposing views was resolved by a blinding insight into the possibility of a new synthesis, collectively arrived at in the last 40 minutes, the participants reeling out of the classroom in an ecstasy of intellectual euphoria and mutual love.

In actuality most teaching falls a little short of that. For one thing it is extremely difficult, I find, to generate argument between students at the undergraduate level, because they are reluctant to appear to be undermining each other's standing in the eyes of their teacher.

A kind of unspoken, invidious pact of solidarity exists which inhibits them from arguing with each other so freely and vehemently as they do outside the classroom; so that occasionally one feels, as a teacher, rather like a soccer referee who, having blown his whistle for a foul, finds the players disconcertingly reluctant to make a move and is reduced to dribbling the ball himself furiously from end to end, scoring brilliant goals in unattended note, while the motionless players look curiously on.

My actual diary looks rather like a list of appointments with Great Books. This week, *The Secret Agent*, *Oliver Twist*, *Sons and Lovers*, *Tess of the D'Urbervilles*, *The Spoils of Poynton*. Next week, *Jude the Obscure*, *Ellor's poetry* in *The Waste Land*, *The Return of the Native*, *Joyce's "The Dead"* and *Norge's Labyrinth*.

Coming back to teaching after a term's study leave, it takes some getting used to this breathless steepchase over one's masterpiece. There is no hope of properly re-reading all these books of course, especially as I am reading *Our Mutual Friend*, all 900 pages of it, for the first time in preparation for seminars a fortnight hence. Half an hour or so spent skimming through one's marked and annotated text will usually restore one's memory of it with a surprising and gratifying degree of definition.

The *Spoils of Poynton* I did re-read and thereby underestimated the time required. James's style has

PAIGE

These desiderata can be divided into two categories—the social and the intellectual; and there is often a conflict of interest between them. The ideal tutorial or seminar would, I suppose, be one in which the clash of opposing views was resolved by a blinding insight into the possibility of a new synthesis, collectively arrived at in the last 40 minutes, the participants reeling out of the classroom in an ecstasy of intellectual euphoria and mutual love.

In actuality most teaching falls a little short of that. For one thing it is extremely difficult, I find, to generate argument between students at the undergraduate level, because they are reluctant to appear to be undermining each other's standing in the eyes of their teacher.

A kind of unspoken, invidious pact of solidarity exists which inhibits them from arguing with each other so freely and vehemently as they do outside the classroom; so that occasionally one feels, as a teacher, rather like a soccer referee who, having blown his whistle for a foul, finds the players disconcertingly reluctant to make a move and is reduced to dribbling the ball himself furiously from end to end, scoring brilliant goals in unattended note, while the motionless players look curiously on.

My actual diary looks rather like a list of appointments with Great Books. This week, *The Secret Agent*, *Oliver Twist*, *Sons and Lovers*, *Tess of the D'Urbervilles*, *The Spoils of Poynton*. Next week, *Jude the Obscure*, *Ellor's poetry* in *The Waste Land*, *The Return of the Native*, *Joyce's "The Dead"* and *Norge's Labyrinth*.

Coming back to teaching after a term's study leave, it takes some getting used to this breathless steepchase over one's masterpiece. There is no hope of properly re-reading all these books of course, especially as I am reading *Our Mutual Friend*, all 900 pages of it, for the first time in preparation for seminars a fortnight hence. Half an hour or so spent skimming through one's marked and annotated text will usually restore one's memory of it with a surprising and gratifying degree of definition.

The *Spoils of Poynton* I did re-read and thereby underestimated the time required. James's style has

PAIGE

These desiderata can be divided into two categories—the social and the intellectual; and there is often a conflict of interest between them. The ideal tutorial or seminar would, I suppose, be one in which the clash of opposing views was resolved by a blinding insight into the possibility of a new synthesis, collectively arrived at in the last 40 minutes, the participants reeling out of the classroom in an ecstasy of intellectual euphoria and mutual love.

In actuality most teaching falls a little short of that. For one thing it is extremely difficult, I find, to generate argument between students at the undergraduate level, because they are reluctant to appear to be undermining each other's standing in the eyes of their teacher.

A kind of unspoken, invidious pact of solidarity exists which inhibits them from arguing with each other so freely and vehemently as they do outside the classroom; so that occasionally one feels, as a teacher, rather like a soccer referee who, having blown his whistle for a foul, finds the players disconcertingly reluctant to make a move and is reduced to dribbling the ball himself furiously from end to end, scoring brilliant goals in unattended note, while the motionless players look curiously on.

My actual diary looks rather like a list of appointments with Great Books. This week, *The Secret Agent*, *Oliver Twist*, *Sons and Lovers*, *Tess of the D'Urbervilles*, *The Spoils of Poynton*. Next week, *Jude the Obscure*, *Ellor's poetry* in *The Waste Land*, *The Return of the Native*, *Joyce's "The Dead"* and *Norge's Labyrinth*.

Coming back to teaching after a term's study leave, it takes some getting used to this breathless steepchase over one's masterpiece. There is no hope of properly re-reading all these books of course, especially as I am reading *Our Mutual Friend*, all 900 pages of it, for the first time in preparation for seminars a fortnight hence. Half an hour or so spent skimming through one's marked and annotated text will usually restore one's memory of it with a surprising and gratifying degree of definition.

The *Spoils of Poynton* I did re-read and thereby underestimated the time required. James's style has

PAIGE

These desiderata can be divided into two categories—the social and the intellectual; and there is often a conflict of interest between them. The ideal tutorial or seminar would, I suppose, be one in which the clash of opposing views was resolved by a blinding insight into the possibility of a new synthesis, collectively arrived at in the last 40 minutes, the participants reeling out of the classroom in an ecstasy of intellectual euphoria and mutual love.

In actuality most teaching falls a little short of that. For one thing it is extremely difficult, I find, to generate argument between students at the undergraduate level, because they are reluctant to appear to be undermining each other's standing in the eyes of their teacher.

A kind of unspoken, invidious pact of solidarity exists which inhibits them from arguing with each other so freely and vehemently as they do outside the classroom; so that occasionally one feels, as a teacher, rather like a soccer referee who, having blown his whistle for a foul, finds the players disconcertingly reluctant to make a move and is reduced to dribbling the ball himself furiously from end to end, scoring brilliant goals in unattended note, while the motionless players look curiously on.

Study leave

I am one of those who think that university teaching is a privileged profession, though as the privileges are earned (by a certain sacrifice of libido in youth and of income later on) I do not feel guilty about it. One of these privileges is being paid (however inadequately) to read and re-read great books. Another is certainly the sabbatical or study-leave.

As the ordinary academic routine of teaching and administration becomes more hectic and time-consuming (and there is no doubt in my mind that this has been the trend since I entered the profession, due to expansion, development of disciplines and the democratization of university government) the institution of study leave becomes more and more vital if research and publication is to be protected and encouraged.

It is not only a question of having time to read but of having a continuous span of time free, in which one's work can develop a rhythm and thrust that can hardly emerge in something put together like a jigsaw puzzle in odd moments.

The practice governing the granting of study-leave varies a good deal from one university to another and from one department to another, and perhaps our profession should give some thought to this matter.

In some places study leave is in the patronage of the head of department and in others a rota system operates, with considerable local variation in the regularity with which leave comes round. Personally I favour the rota system, since one man's leave is "paid for" by everyone else working a little harder, but with perhaps more formal report of what individual scholars in their study leave than is usually required.

I admit that this condition might exacerbate the very real stresses which the boon of study-leave can, paradoxically, generate and which might be worth the investigation of sociologists and psychologists.

What interests me immediately is whether any sense at all can be made of the idea of "the important national need for graduates" or of the Association of University Teachers' identical demand that the universities must have funds in order to produce the high-quality graduates and first-class research that industry, the professions and society at large so urgently need.

A good deal of the time, I think, is not a good idea to take the summer term off.

PAIGE

These desiderata can be divided into two categories—the social and the intellectual; and there is often a conflict of interest between them. The ideal tutorial or seminar would, I suppose, be one in which the clash of opposing views was resolved by a blinding insight into the possibility of a new synthesis, collectively arrived at in the last 40 minutes, the participants reeling out of the classroom in an ecstasy of intellectual euphoria and mutual love.

In actuality most teaching falls a little short of that. For one thing it is extremely difficult, I find, to generate argument between students at the undergraduate level, because they are reluctant to appear to be undermining each other's standing in the eyes of their teacher.

A kind of unspoken, invidious pact of solidarity exists which inhibits them from arguing with each other so freely and vehemently as they do outside the classroom; so that occasionally one feels, as a teacher, rather like a soccer referee who, having blown his whistle for a foul, finds the players disconcertingly reluctant to make a move and is reduced to dribbling the ball himself furiously from end to end, scoring brilliant goals in unattended note, while the motionless players look curiously on.

My actual diary looks rather like a list of appointments with Great Books. This week, *The Secret Agent*, *Oliver Twist*, *Sons and Lovers*, *Tess of the D'Urbervilles*, *The Spoils of Poynton*. Next week, *Jude the Obscure*, *Ellor's poetry* in *The Waste Land*, *The Return of the Native*, *Joyce's "The Dead"* and *Norge's Labyrinth*.

Coming back to teaching after a term's study leave, it takes some getting used to this breathless steepchase over one's masterpiece. There is no hope of properly re-reading all these books of course, especially as I am reading *Our Mutual Friend*, all 900 pages of it, for the first time in preparation for seminars a fortnight hence. Half an hour or so spent skimming through one's marked and annotated text will usually restore one's memory of it with a surprising and gratifying degree of definition.

The *Spoils of Poynton* I did re-read and thereby underestimated the time required. James's style has

PAIGE

These desiderata can be divided into two categories—the social and the intellectual; and there is often a conflict of interest between them. The ideal tutorial or seminar would, I suppose, be one in which the clash of opposing views was resolved by a blinding insight into the possibility of a new synthesis, collectively arrived at in the last 40 minutes, the participants reeling out of the classroom in an ecstasy of intellectual euphoria and mutual love.

In actuality most teaching falls a little short of that. For one thing it is extremely difficult, I find, to generate argument between students at the undergraduate level, because they are reluctant to appear to be undermining each other's standing in the eyes of their teacher.

A kind of unspoken, invidious pact of solidarity exists which inhibits them from arguing with each other so freely and vehemently as they do outside the classroom; so that occasionally one feels, as a teacher, rather like a soccer referee who, having blown his whistle for a foul, finds the players disconcertingly reluctant to make a move and is reduced to dribbling the ball himself furiously from end to end, scoring brilliant goals in unattended note, while the motionless players look curiously on.

My actual diary looks rather like a list of appointments with Great Books. This week, *The Secret Agent*, *Oliver Twist*, *Sons and Lovers*, *Tess of the D'Urbervilles*, *The Spoils of Poynton*. Next week, *Jude the Obscure*, *Ellor's poetry* in *The Waste Land*, *The Return of the Native*, *Joyce's "The Dead"* and *Norge's Labyrinth*.

Coming back to teaching after a term's study leave, it takes some getting used to this breathless steepchase over one's masterpiece. There is no hope of properly re-reading all these books of course, especially as I am reading *Our Mutual Friend*, all 900 pages of it, for the first time in preparation for seminars a fortnight hence. Half an hour or so spent skimming through one's marked and annotated text will usually restore one's memory of it with a surprising and gratifying degree of definition.

The *Spoils of Poynton* I did re-read and thereby underestimated the time required. James's style has

PAIGE

These desiderata can be divided into two categories—the social and the intellectual; and there is often a conflict of interest between them. The ideal tutorial or seminar would, I suppose, be one in which the clash of opposing views was resolved by a blinding insight into the possibility of a new synthesis, collectively arrived at in the last 40 minutes, the participants reeling out of the classroom in an ecstasy of intellectual euphoria and mutual love.

In actuality most teaching falls a little short of that. For one thing it is extremely difficult, I find, to generate argument between students at the undergraduate level, because they are reluctant to appear to be undermining each other's standing in the eyes of their teacher.

A kind of unspoken, invidious pact of solidarity exists which inhibits them from arguing with each other so freely and vehemently as they do outside the classroom; so that occasionally one feels, as a teacher, rather like a soccer referee who, having blown his whistle for a foul, finds the players disconcertingly reluctant to make a move and is reduced to dribbling the ball himself furiously from end to end, scoring brilliant goals in unattended note, while the motionless players look curiously on.

My actual diary looks rather like a list of appointments with Great Books. This week, *The Secret Agent*, *Oliver Twist*, *Sons and Lovers*, *Tess of the D'Urbervilles*, *The Spoils of Poynton*. Next week, *Jude the Obscure*, *Ellor's poetry* in *The Waste Land*, *The Return of the Native*, *Joyce's "The Dead"* and *Norge's Labyrinth*.

Coming back to teaching after a term's study leave, it takes some getting used to this breathless steepchase over one's masterpiece. There is no hope of properly re-reading all these books of course, especially as I am reading *Our Mutual Friend*, all 900 pages of it, for the first time in preparation for seminars a fortnight hence. Half an hour or so spent skimming through one's marked and annotated text will usually restore one's memory of it with a surprising and gratifying degree of definition.

The *Spoils of Poynton* I did re-read and thereby underestimated the time required. James's style has

National needs and the universities



IAN ROBINSON

"The complex of university institutions is thus able to respond flexibly to indications of social demand and national needs and to accommodate them in a complementary relationship with the demands of scholarship."

Thus the vice-chancellors in a document called *Universities in a Period of Economic Crisis*, November 1975, in the course of pleading for "a reasonable planning perspective" in order to make "decisions giving rise to long-term commitments" and generally to be allowed to remain in their bureaucratic haven of long-term planned expenditure.

I will not now discuss the visionary nature of this demand, so much a feature of this decade, and just like the Ryder projections about what British Leyland is going to be like in the middle 1980s.

Nor will I give more than a passing thought to the style. Bureaucracy is no doubt the same the world over and the bureaucratic style is always a mark of expediency.

What interests me immediately is whether any sense at all can be made of the idea of "the important national need for graduates" or of the Association of University Teachers' identical demand that the universities must have funds in order to produce the high-quality graduates and first-class research that industry, the professions and society at large so urgently need.

A good deal of the time, I think, is not a good idea to take the summer term off.

PAIGE

These desiderata can be divided into two categories—the social and the intellectual; and there is often a conflict of interest between them. The ideal tutorial or seminar would, I suppose, be one in which the clash of opposing views was resolved by a blinding insight into the possibility of a new synthesis, collectively arrived at in the last 4

University teachers reply to their 'ill-informed' critics

Since the Government's acceptance of the Robbins report in 1963, the universities have consistently achieved the targets set in student numbers. The targets have been achieved with a significantly higher student: staff ratio than that operating in the polytechnics.

No small part of the present difficulties faced by the universities stems from this considerable achievement. The universities have to make permanent investments in buildings and staffing to meet this demand for places, a demand frequently distorted by Government manpower planning as well as by student choice. Universities cannot immediately redistribute these resources in response to transient fluctuations in student numbers of their choice of subject; to attempt to do so would also extinguish another essential function of a university, to advance the frontiers of knowledge.

This is the central problem of planning in universities today. The overall costs per student in the universities also show great efficiency in the use of resources. While the apparent cost per student is higher in the universities (approximately £1,500) compared with polytechnics (approximately £1,100) the true cost per comparable student is lower. The university figure includes the cost of the highly expensive research element which the polytechnics do not train.

On a comparable department basis, for example, technology departments, the unit cost per student is lower in the universities and since this includes the research cost, in which area the universities are markedly more efficient (see research aspects below), the nation is extremely economically served by them.

The university lecturer has achieved this comparably higher level of teaching efficiency whilst also engaging in other significant, wealth-producing activities for the nation—research (see below), government and other consultancy services (see table 1). His polytechnic counterpart apparently devotes a much greater period of his time to fewer students (table 1).

If these figures are valid (the university figures correlate with those found by the University Grants Committee Inquiry in 1972) then the polytechnic teacher spends only 25 hours per week during term time in the polytechnic in the execution of

his professional activities. This figure should be compared with the average time spent by university lecturers on their professional duties of 50 hours per week for a 47-week year (CVCP-UGC Inquiry 1972).

In contrast to the polytechnic teacher the university lecturer is better qualified on entry (see table 2), subjected to a strict probationary service for three years and then an efficiency bar after eight years of service.

The myth of university "tenure" should therefore be exploded, it is hard earned, not enjoyed by all staff in post and no greater than that enjoyed by many employees. It is therefore surprising that for the past 18 months the university staff have been paid considerably less than their polytechnic counterparts and following recent settlements in both sectors the universities still lag behind.

Apart from their work with undergraduate and post-graduate students many university teachers have also concerned themselves with some of the more disadvantaged groups in the wider community. In the case of Sheffield much of this concern has been articulated through the extramural department of the university.

Research aspects
The research effort both in time input and productive output is extremely high in universities. The DES survey in Sheffield (table 1) revealed that the average university lecturer spends 31 per cent of his time on research or directing post-graduate research work against the polytechnic teacher's 9 per cent.

This difference is reflected in research output. A single academic department in Sheffield University with approximately 35 academic staff published more research in one year than the total academic staff (approximately 350) of the Sheffield Polytechnic—a major polytechnic. At the same time university staff were engaged in supervising over one-third of the ongoing research projects in that polytechnic.

The research effort in universities is not an indulgence conferred by society on a favoured few. It is an essential element of a university, it is a condition of employment, it is staff and it is vital in its impact upon teaching. Fundamental university research is not only an in-

TABLE 1

Extract from a report for the DES (The Survey of Higher Education Institutions in Sheffield) prepared by the Sheffield Postgraduate School of Library Science 1975 (T. D. Wilson and W. Marston).

	Sheffield Polytechnic	Sheffield University
No of academic staff	330	844
Principal Activity (% time)		
Teaching	70.9	36.1
Research guidance	10.9	11.7
Administration	9.4	30.9
Writing	0.9	1.1
Consulting	1.5	1.1
Other	3.9	1.4
Multiple responses*	0.6	0.6

*Some respondents found it impossible to give one activity as their "principal activity".

vestment in the Nation's future, it also has an immediate impact in many cases. In 1974 alone the National Research Development Council-sponsored research projects in universities yielded over £9m in world-wide royalties.

Consultancy by university staff in research by industry is vital and economical and many modern industries owe their foundation to fundamental research efforts in the universities. The universities not only train our own research workers for medicine, science and engineering, but also make a substantial "invisible export" and currency earner by training similar skilled personnel for overseas countries.

Cut-back in expenditure
The universities were subjected to sharp financial cuts on capital and recurrent expenditure as early as 1972, well before the current onslaught on public expenditure. Since then they have been only partly compensated in recurrent expenditure for inflation. In 1973 a moratorium was imposed on their building projects and later drastic cuts were made in their building programme (£30.6m reduced to £11.5m).

The cuts in university expenditure are therefore real cuts and not the "nil growth" which is currently being imposed on other areas of education. The stop-go approach to building has impeded the provision for medical expansion and student intake in Sheffield. The Government's expansion of medical schools has been haltingly expressed.

Cut-backs have been made in staffing levels by the earlier government economies and by the university staff in order to balance the fall vacant in order to balance the posts have been frozen, together with supporting staff posts. This loss of staff was uncontrollable and was greatest in areas where university salaries and conditions are now grossly uncompetitive and also

TABLE 2

COMPARISON OF UNIVERSITY AND POLYTECHNIC TEACHER QUALIFICATIONS

(a) Sample Survey of 6 Polytechnics and 6 Universities (1974-1975) Quality of Degree

	Polytechnics	Universities
Principal Lecturers	7	10
All Staff	10	10
Lecturers	10	10
Less than degree qualification	3.9	6.5
Bachelor	38.8	56.7
Master	38.8	28.3
Doctorate	18.21	13.21
Number	(258)	(2094)

1 including 1 D.Sc.
2 including 14 D.Sc.

TABLE 3

Indices of university teachers' salaries (non-clinical) compared with Department of Employment economics indices, (April 1965=100)

	Index of weekly wages rates	Index of weekly retail prices (all industries)	Index of university teachers' salaries (non-clinical)
April 1965	100	100	100
Oct. 1972	185	192	168
Oct. 1973	206	216	184
Oct. 1974	224	252	208
April 1975	288	291	224

1—Latest published figure—March
2—Salaries include 7 threshold payments
3—Salaries include 11 threshold payments

where the university and the nation can ill afford to lose strength, for example, in the training of medical students. This loss is predominantly in areas where outside professional opportunities exist and in polytechnics, which continue to offer salaries grossly in excess of those the universities offer the same recruits.

These cut-backs in staff, recurrent finance and building projects have so far been absorbed with great difficulty by the universities. However, we have now reached a point where further cuts and the effect of continued salary disparity will impair the proven teaching and research efficiency of the university.

Salaries
The salaries of university lecturers are lagging far behind their comparable Civil Service grades and well below those in polytechnics which a year ago the Houghton report sought to bring to parity with the universities. University staff have taken more than their fair share of salary redistribution during the past decade (see table 3).

University staff were almost the only group of public servants refused a cost-of-living increase under the Social Contract. In view of the observations set out in this paper it is a matter of great dismay and surprise to university staff to find positive discrimination against them by the DES and the present Government.

By a curious coincidence of dates with successive government pay policies the decision of an Arbitration Tribunal in May, 1975, to set university salaries 8 to 12 per cent above those in polytechnics has been thwarted, as have the government's

Seldom have so few scientists got so much

Is scientific research in Britain controlled by a small group of inordinately powerful scientists? This edited extract from a Parliamentary report* shows that almost 25 per cent of the Science Research Council monthly budget is controlled by only 36 scientists.

One of the objectives of the Science Research Council's policy of selectivity and concentration is the attainment of an optimal allocation of resources. The operation of a policy of selectivity and concentration is no doubt made at a variety of levels within the SRC. Ultimately, however, the outcome of all these processes is observable from the published records of the council.

The principal objective here is to illustrate how different patterns of resource allocation emerge. A further objective is to suggest that the *de facto* operation of the policy of selectivity and concentration has resulted in the concentration of large resources in a handful of outstanding individuals.

The precise implications of this interpretation of the data are difficult to determine but they would seem to indicate that the very least that SRC policy is as much influenced by the demands of a small group of scientists as by any centralized decisions about what lines of research ought to be pursued.

The data published here have been drawn directly from the published records of the SRC and post-dated by the 1973-74 lists of research grants current.

In the year 1973-74, slightly more than 3,000 grants worth a total of nearly £53m were in effect. These were distributed about a mean value of approximately £17,000. However, it is noteworthy that while 74 per cent of the grants lie below the mean, 1.9 per cent are worth £50,000 or more and, in relation to this latter fact, the influence of the relatively few grants in the high pounds/grant region, that one should interpret the significance of the mean value.

A more explicit way of expressing the domination of the allocation pattern by the relatively few high value grants is shown in figure 1. In this graph, the vertical axis represents the percentage of the total pounds current and the horizontal axis represents the percentage of the total number of grants. The curve is the cumulative of the data expressed as a percentage of the total pounds current. The cumulative begins from the £99,000 and over bar and terminates at the £1,000 bar.

From this presentation, one can determine, for example, that 1.9 per cent of the grants worth £99,000 or more account for 21.4 per cent of the total value of research grants current. Further, by the time 10 per cent of the grants have been awarded, 42.6 per cent of the budget has been allocated. On the other hand, one can note that the grants which lie below the mean (that is 74 per cent) constitute only 33 per cent of the budget.

One convenient means of indexing the degree of concentration of research grants is displayed in figure 1. Because the £99,000 and over bar represents the largest proportion of the budget with respect to

Obviously some of the plans applicants, but Dr. H. H. Rington, dean of the Institute of Education, has been appointed to build on the specialist interests. He is also a specialist in the field of education and has been appointed to ensure that if in-service courses are offered they are based on expertise and not on providing redundant lectures with a limited number of students.

Thus it is not a coincidence that the National Association of Teachers of English in the Schools, the Association of Government Service Teachers and the Association of Gifted Children have all been invited to specialist interest. Nor is it a coincidence that the National Association of Teachers of English in the Schools, the Association of Government Service Teachers and the Association of Gifted Children have all been invited to specialist interest.

Indeed one of the main problems facing the college is that it is easily exceeded its 20 per cent of in-service provision. It is likely that the college will be able to rather than retard its progress.

Such progress does give rise to a number of difficulties which will find themselves working the day as well as evening. It is also a considerable cross-section between work on initial and advanced courses which is likely to grow as the 1,200 students develop its humanities department.



In this experiment we have found that if we give all the food to the fat rats they do much better than the others...

all other bars and because the curve is obtained by adding the other bars sequentially, the straight line represents one limiting case of the cumulative curve; the case where *n* per cent of the grants account for *n* per cent of the total. Similarly, the upper limit is reached when all the grants are concentrated in one grant—that is when a fraction of 1 per cent of the grants account for 100 per cent of the budget.

For any actual distribution of resources, the cumulative curve will lie somewhere between these two extremes. Thus, if the area bounded by the curve and the straight line (shown as the shaded area) is divided by the area bounded by the curve and the lower limit, the resulting fraction constitutes one indicator of the degree to which resources have been concentrated in a few large grants. This index spans values between 0 and 1, where 0 represents a uniform distribution of funds by research worker; it can be shown that 36 researchers control 23 per cent of the monthly budget.

This increase in the concentration of research funds is more marked when the recipients of awards are divided into those who received one grant and those who received more than one grant. The mean monthly value of grants is 29 per cent higher for grants which were awarded to people who received more than one grant (£420/grant-month for the one grant case and £550/grant-month for the more than one grant case).

The distributions indicate that, on the average, the grants awarded to researchers who accumulated more than one grant tended to be of a relatively high value. For example, of the 31 grants whose values were £3,500/month or more, 13 were given to individuals who received more than one grant. Conversely, of the 919 grants whose value was £200/month or less, only 307 (33 per cent) were given in conjunction with at least one other grant.

Thus it would appear that not only are funds concentrated in relatively few researchers, but, the composition of this concentrating effect is such that, for those individuals who amass several grants, the value of these grants is relatively high. Accordingly, the policy of concentration appears to have operated in such a way that not only are funds concentrated in a few grants and consequently a few researchers, but, in addition, funds have become further concentrated as a result of accumulation of several highly valued grants by several individuals.

The extent to which this core of heavily funded researchers is either in a position of influence with respect to the direction of policy in the SRC or is the product of decisions concerning what research areas ought to be explored is a question which should be examined. That is, has this concentration of funds within these researchers arisen out of decisions to explore certain areas of science, or is it that these individuals command scientific funds and hence the areas of exploration?

*Appendix II of the first report 1976 of the Select Committee on Science and Technology, Scientific Research in British Universities HMSO 75p.

How 'British Steel/Pilkington' got on with 'the bolshy lot'

Tony Aldous describes a London polytechnic's experiment in cooperation on a design project

short-life buildings. Design teams were not to ask the client for ideas or a budget figure—"I am looking to you for both", the memo added pitilessly.

From the clients' viewpoint, the exercise provided an interesting example of group dynamics. Unfortunately in some groups the challenges presented by imaginative design proved beyond the technical knowledge of final-year structural engineering students.

The student architects mostly made the running and, as one of the presiding lecturers put it: "To answer the kind of questions that arise about structures, you really need to have had about 40 years' experience as a structural engineer."

None the less in some groups the environmental engineer played a leading role in one case using pools to display sailing boats and to provide cheap air conditioning processes—in some the "structuralists" in others the interior designers powerfully affected the overall quality of the design.

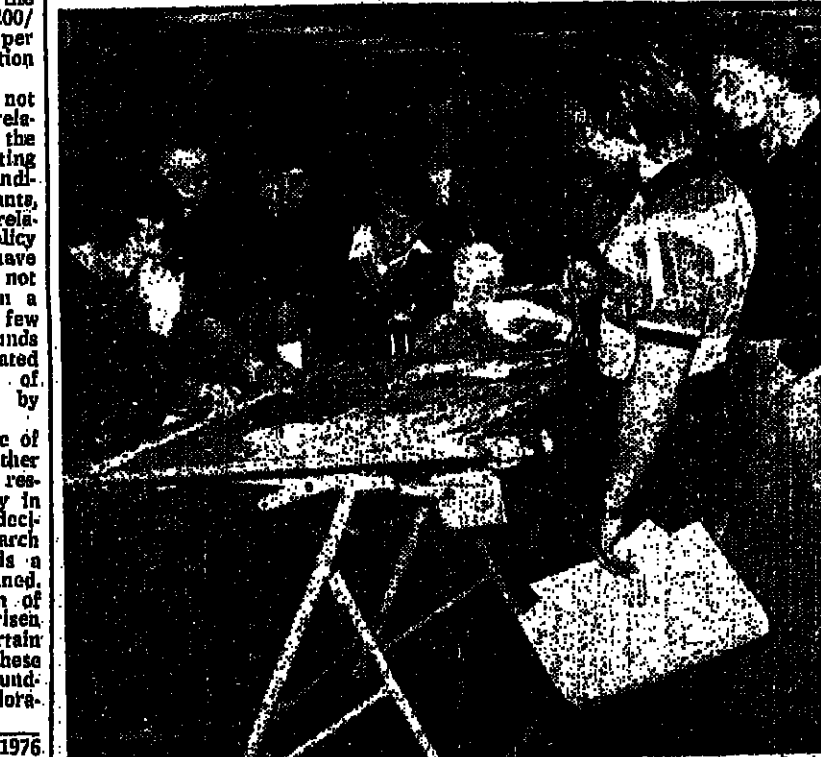
From the dawned, leisurely inquisitiveness of the first morning, the groups grew steadily hotter, smolder and more desperate by the afternoon of day two. Almost all groups remained quiet and in spite of some provocation and changes of mind, though it is reported that tempers within some groups became frayed. One structural engineer walked out, telling his architect: "I don't want you, I want my own building to do with it."

Most groups worked into the small hours; one or two disappeared from the design studio altogether and had to be reminded that, however excellent their work, a client could reasonably expect to be kept in touch with progress.

I found myself identifying groups with such mental labels as "the crisp Miesian Shodmon and glass", "the British Steel/Pilkington", "the bolshy lot" (because he had to push hard to get them to follow his guidance), and was rewarded by hearing one of them say, of him as the client's representative: "That's the bolshy one!"

The afternoon of day three brought "the crit. session" with exposition of each design by its team and questions and comment, largely from other teams but with clients' teaching staff joining in. Some of the designs were highly imaginative and/or well worked out; but the main value of the exercise stems from this early experience of different professions working together as a team on a practical project.

All departments marked their students' performance as part of their course assessment except for architecture. On the face of it, it seems that only student architects will work hard without murling—or at least that teachers in other departments think they will not.



Engineers, architects, surveyors, designers, working out their approach to the design problem.

Bold new scheme could save jobs and money

David Hencke on a Lancashire project to rationalize in-service training for teachers

A meeting this week at Lancashire County Council's headquarters marks the beginning of an important experiment in in-service training for teachers which can both extend the provision of courses and save the public money.

If it is successful the scheme should safeguard the jobs of lecturers in colleges of education and provide a greater variety of easily accessible courses for teachers in Lancashire and neighbouring authorities.

The basic idea is that Lancashire County Council will contract the majority of its in-service teacher training programme to the three major centres of higher education which will in turn be able to offer the reorganization of the public sector. The training will be done in these institutions as well as in teacher centres as is usually the case and by the college lecturers alongside local authority advisory staff.

The three centres, St Martin's College of Education, Lancaster, a voluntary college; Preston Polytechnic, whose new education department includes two former teacher training colleges at Chorley and Poulton-le-Fylde; and Edge Hill College of Higher Education, Ormskirk, a new diversified college of education, will extend their in-service provision so that it makes up 20 per cent of their places, the per-

centage laid down by the Department of Education and Science calculations for 1981.

In return, the local authority, after consultations with each college, will draw up a list of short courses and part-time in-service courses, which will be published in an annual teachers' handbook. Once these courses are listed teachers will be able to apply for secondment knowledge of their own colleges will be able to enter their names, thus meeting demands laid down to reach a target of 20 per cent in-service provision. Local authorities will save money by not having to pay lecturers extra fees for running the courses since members of the courses will count towards their student numbers.

The rationalization of resources depends on both the skill and expertise local colleges can provide. National restraints, including pres-



Edge Hill College of Higher Education.

sure from the Department of Education that resources be fully utilized, and the fact that local colleges will have to offer wider ranges of courses. Teachers can no longer expect, as of right, full-time secondment to attend a course on the other side of the county.

Edge Hill College of Higher Education, which has a long tradition of in-service courses, has recently changed its academic structure to strengthen in-service provision. It has established three divisions for academic work and allocated one wholly to in-service work and related teaching and humanities courses.

Under the divisional academic structure a complicated new system of representation, which includes established, a consultative committee, which includes local authorities,

advisers, has been set up to provide local authority help and advice in expanding college activities. Within the in-service division there are specialist boards of studies covering higher degrees and advanced diplomas, advanced certificates and college awards which are validated by Lancaster University.

There are also six study centres, three of them paralleled by in-service study areas, which the division and three parallel services provided under initial training. The centres are: language in education, special educational needs, counselling and related services, science and technology, art and design, and computer education.

One major feature is that local teachers are encouraged to visit the college whenever they wish as well as to attend courses.

Open University and continuing education

The author is principal of Nelson
and Colne College.

A national agency of this kind would have to provide machinery for choices to be made between different uses of central government funds. With an overview of the whole field, it would inevitably be in the position of determining to some extent, priorities among the proposals for collaborative ventures of various kinds and amongst the various institutions making such proposals.

not be so in all cases; then the problems of the appropriate channel and transmission times will be very urgent. Any substantial development in continuing education by open network methods which require broadcast outlets, carries with it a requirement for guaranteed access to additional hours of broadcasting on either existing or new channels. This need has been stressed in the submission which the university has already made to

ing the next 10 years. The implication seems to be that not only the Open University, but also many other institutions, will experience the need to adapt to changing circumstances as continuing education develops.

Against this background it may be as well to indicate the two main areas in which the committee sees the Open University contributing to continuing education.

The author is principal of Nelson
and Colne College.



Given the other roles of DES and

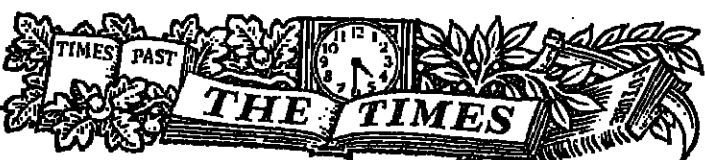
The author is principal of Nelson
and Colne College.

۱۵۱۸۹

Additional programmes for north Scotland
and parts of Wales

24.00	Twentieth-century Poetry	Harve
	and the Ballads (ASOE; prod 1)	
00.20	People and work	Bluch
	The Management View (DECO)	
00.40	Technology foundation course: Part 1	
	and 2 (TLO; prod 5)	

repeated programme.



HIGHER EDUCATION SUPPLEMENT
New Printing House Square, London WC1X 8EZ. Telephone 01-837 1234

Selectivity and the SRC

Few of those reading the report on scientific research in British universities from the science subcommittee of the House of Commons Select Committee on Science and Technology can fail to have been struck by its appendix on selectivity and concentration in the Science Research Council.

A significant characteristic of much of the material submitted to the subcommittee at its earlier hearings was the sheer lack of substantial evidence offered in support of claims about what was right—or, more frequently, wrong—about the way that research grants were allocated, with vague charges of unfair discrimination (against smaller universities, for example) or the financial burden of particular research areas (such as nuclear physics).

The report's appendix sets out an analysis of the research grants issued by the SRC in the year 1972-74 and demonstrates how, using several "indices of concentration," different patterns of research allocation emerge. In 10 pages of graphs and three pages of tables it shows, for example, the relationship between the number of grants and the size of each grant (demonstrating that, by the time 10 per cent of the grants have been awarded, 42.6 per cent of the budget has been allocated), or the size of individual grants between different boards, calculated on a monthly basis.

In itself, the conclusions of the analysis, however much they may have surprised the members of the Select Committee, should cause little surprise in the scientific community. According to the appendix, for example, the analysis indicates "that SRC policy is as much influenced by the demands of a small core of scientists as from any centralized decisions about what line of research ought to be pursued. This merely indicates that the established principles of respecting the autonomy of the scientific community, and of using research council money to support 'the man (or woman) as much as the project,' are still in operation."

The subcommittee may be right to suggest that in the light of the evidence revealed by the analysis, it considers that there is room for further study of the extent to which the existence of a handful of

highly-favoured university scientists may influence the formulation of SRC policy. But this is no shock revelation, merely the public presentation of a situation which has been implicitly acknowledged for years.

Yet the very fact that such acknowledgement has remained implicit is itself an indication of the value that such an analysis can have. It contains information that is in some form; details of the grants provided by the SRC were taken directly from the published records of the council, and in particular, it is based on the council's *List of Research Grants Current on October 1, 1974*.

There is a deep difference, however, between public availability and public accessibility. All too often Government departments seem to fail to recognize that the mere publication of long lists of statistics, with little indication of their significance or relevance to overall policy, can be worse than useless. Not merely do they deny, through their technical nature, accessibility for the non-statistically trained to important information—and this includes members of Parliament. But, as Disraeli recognized with his "lies, damn lies and statistics," they can disguise their real significance and give a totally misleading impression of the message they were intended to convey.

The subcommittee comments favourably on the situation in the United States where anxiety to improve the machinery by which research policies are formulated and assessed, has resulted in the increasing appointment of professional staff to congressional advisory committees.

One important role that universities could play at the present time is in helping to open up the sphere of public decision-making by careful assessment and presentation of the significance of Government (and perhaps more importantly, departmental) decisions. Isolated efforts to do this for science have been carried out by, for example, the department of liberal studies in science at the University of Manchester. Perhaps the main message of the Select Committee's report is that such work should be supported and expanded.

A truth teller's hapless end

No minister of higher education in the past decade has been more reviled than the hapless Lord Crowthurst, whose main (political) failing was an instinct to blurt out the truth instead of the sweet nothings that universities and polytechnics understandably prefer to hear.

Lord Crowthurst will be remembered chiefly for his advocacy of more manpower planning, his support of regional planning in further and higher education, and his suggestions as to how universities and polytechnics could expand more cheaply. Yet, as when Mrs Shirley Williams made similar noises in 1969, his audiences remained largely dumb and simultaneously bewildered by the steady deterioration of the quality of their working lives.

Observers, however, knew that the minister of state was simply anticipating the inevitable trend of events, and his Manchester and Scarborough speeches last year will make useful reading after the publication this month of the 1976 White Paper on Public Expenditure.

It is also likely that Lord Crowthurst anticipated a greater national debate about manpower planning. The Prime Minister died, in an unremarked speech at Bradford University in December, said: "Crucial to the industrial strategy that Britain must follow—

accepted by Government and industry—is the need for a more effective manpower policy and a better supply of skilled manpower for growth industries. . . . We must see to it that our economic recovery is not held back by the lack of people with appropriate training in business, the sciences, engineering and other technologies."

Similar observations could be made about the former minister's views on regional development and co-operation between universities and polytechnics. Lord Crowthurst, in company with his predecessor, Lord Selsby, is an intrinsically decent man, who has pitched into a sensitive Whitehall department without the political skills that most politicians pick up as professional politicians. It was this that led to some of his difficulties.

A suspicion of evil servants probably meant that he did not alert himself sufficiently to the impact of his early speeches. He did, by instance, to put across his beliefs about manpower planning with the clarity required of an argument on a matter of such importance to the nation. It was not his fault, however, if at Nottingham last autumn, on orders from Mr Mulley, Secretary of State, he returned to a speech of sweet nothings and seemed to do an about-face.

Lord Crowthurst deserves a more generous tribute than the academic community will at present be prepared to give him.

LETTERS TO THE EDITOR

Supervisors as examiners

from Professor D. C. Freshwater

Sir,—Dr Ayres and his fellow signatories (THES, January 23) make the interesting but not novel suggestion that candidates for higher degrees by research should not have their supervisor as an internal examiner.

This has already practised at Bristol and in some departments at Birmingham and has certainly been debated there. There is some truth in the argument that the candidate's supervisor generally thinks that he merits the higher degree but this is not always the case.

I have known occasions, both as internal and external examiner, when candidates have submitted theses against the advice of their supervisor.

However, an even more attractive alternative in my view would be to adopt the confident and United States practice of the defence of the thesis whereby the examination is conducted not only by an external examiner but by many members of staff of the department as a whole.

It is to be noted that in the United States the candidate is not given three hours but a whole day and, on occasions, two days.

Having taken part in these examinations both in America and on the continent, I am impressed by the real rigour by which the candidate is tested over the whole field of his study.

Another thing that I would like to see copied from continental practice is for the candidate to submit his thesis in long-leaf form. This makes it very much easier for the examiner to insist on really significant modifications to the work which many examiners are reluctant to do when the thesis is bound up before the examination as is common practice in this country.

However, this argument is really being conducted without some vital information—a knowledge of the percentage failure rate. I suspect that as few candidates fail their PhD examination in America as do in this country. Changing the examination to long-leaf form, and pre-paration but to do this effectively would have to be such that its immediate short-term effect was to increase the failure rate.

Yours faithfully,
D. C. FRESHWATER,
Professor of chemical engineering,
Loughborough University.

from Professor Igor Aleksander

Sir,—Before the argument about the incoherence of PhD examinations was put forward in one direction, I would like to present an alternative view, and perhaps suggest that the discussion is missing the point anyway.

In universities where the supervisor has little or no part to play in the examination of his student, I fear that there is a danger of the student being subjected to an unfair examination. I say this not because I have no faith in the system of external examiners, but because the internal supervisor can provide valuable information regarding the probable performance of the candidate in the examination.

One role which the supervisor of a candidate working in a team must exercise is that of coordinating and guiding the direction taken by individual members of the team. This requires that the candidate takes steps which he himself cannot fully justify without having the proper overview of the aims of his team leader.

In other words, it is terribly important for the supervisor to be able to take an oral examination, perhaps as an observer, but what he may "carry the can" if and when required.

Despite the above, I feel that the system of examining PhD students does need a thorough revision. Its main failing is that in many cases the candidate is asked to write a thesis on a subject outside the candidate and his supervisor's field of expertise, and this is a serious disadvantage.

I rather favour the French way of doing things. It is a view of a draft of the thesis about six months or so before its final submission. They then have the opportunity of acquainting both candidate and supervisor of possible weaknesses, which the candidate can put right before the final examination. This is usually a rather formal affair, but ensures that weak theses never get to that stage.

Having had some experience of this type of examination, I am convinced that the French tradition often results in better theses which are widely read, rather than being relegated to the oblivion of dusty library shelves, as is often the case in this country.

Yours faithfully,
IGOR ALEKSANDER,
Professor of electronics,
Brunel University.

Sociology split

from Professor O. R. McGregor

Sir,—Dr John Wakeford (THES, January 16) that the Sociological Association wishes to retain a single committee for sociology and social administration, contrary to the decision of the Administration Association of Professors R. A. Plinkar (THES, January 30), prefers a state committee.

One of the difficulties of Wakeford's assertion that he knows better than the SAA what is best for social administration is that it is accepted, the SAA find it hard to resist a proposal by the SAA to amalgamate sociology and social administration committees with, say, the anthropology (or some other) committee on the ground that such separation "might damage the mainstream of sociology."

It is the request of the SAA to reject its members who feel the SAA is discriminating against professional bodies in the SAA carries responsibility for proper allocation of public funds and must surely either establish separate committees for social administration or be prepared to amalgamate its whole committee.

Yours sincerely,
O. R. MCGREGOR,
Professor of Social Institutions,
Bedford College,
University of London.

from Mr M. J. Bulmer
Sir,—The divergence of views between Dr Wakeford of the SAA and Professor Plinkar of the SAA about splitting the SAA into two committees, one for sociology and one for social administration, is a matter of some importance. It is a matter of whether there is a law of social science.

Social science subjects as distinct from sociology, are each other as sociology, anthropology, social psychology, social history, demography, and administration, and so on. It is a matter of whether there is a law of social science.

Even social research methodology, which is its study is applied on any scale, may be institutionalized in yet another organization, without particularly disciplinary links. There are, over a number of instances in the past where departments or faculties of studies which contained many of these subjects have been split up, and the result has been a loss of subject-matter.

Perhaps this is inevitable in the present case, however, the theoretical rationale of a separate committee needs to be established. One justification for maintaining a link between sociology and social administration is that the theory of the former can inform the practice of the latter, and vice versa. For example, the theory of social stratification can be used to explain the theory of social mobility, and vice versa. For example, the theory of social stratification can be used to explain the theory of social mobility, and vice versa.

The theoretical rationale of a separate committee needs to be established. One justification for maintaining a link between sociology and social administration is that the theory of the former can inform the practice of the latter, and vice versa. For example, the theory of social stratification can be used to explain the theory of social mobility, and vice versa. For example, the theory of social stratification can be used to explain the theory of social mobility, and vice versa.

The theoretical rationale of a separate committee needs to be established. One justification for maintaining a link between sociology and social administration is that the theory of the former can inform the practice of the latter, and vice versa. For example, the theory of social stratification can be used to explain the theory of social mobility, and vice versa. For example, the theory of social stratification can be used to explain the theory of social mobility, and vice versa.

The theoretical rationale of a separate committee needs to be established. One justification for maintaining a link between sociology and social administration is that the theory of the former can inform the practice of the latter, and vice versa. For example, the theory of social stratification can be used to explain the theory of social mobility, and vice versa. For example, the theory of social stratification can be used to explain the theory of social mobility, and vice versa.

The theoretical rationale of a separate committee needs to be established. One justification for maintaining a link between sociology and social administration is that the theory of the former can inform the practice of the latter, and vice versa. For example, the theory of social stratification can be used to explain the theory of social mobility, and vice versa. For example, the theory of social stratification can be used to explain the theory of social mobility, and vice versa.

BOOKS

Diagnosing society's ills does not provide a cure

Karl Marx's Philosophy of Man
by John Plamenatz
Oxford University Press: Clarendon Press, £9.50
ISBN 0 19 824551 3

What is usually studied as "political theory" in English universities is a strange, ambiguous enterprise. It is like, but isn't exactly, intellectual history on the one hand or moral philosophy on the other; it seems to define itself by constant reference to the "great thinkers" and the "great books" of the past, but its interest in them is not historical, not a concern to trace influences and impact. It is vulnerable, when practised in this fashion, to a variety of complaints—historians ask whether the theorists "Locke" is the John Locke they know, while philosophers ask why we cannot think about equality, any, or liberty, rather than what Marx thought about equality or what Mill thought about liberty, and radicals want to know why we can't think about contemporary politics in contemporary terms, why we have to shelter behind Hobbes, Rousseau or whoever. Still, in spite of the dubiousness of its intellectual foundations, and the frequency with which its ill have been diagnosed as fatal, the subject persists; enough able men and women find this curious conversation with the dead irresistible, or, perhaps, merely find that nothing else stimulates their own thinking in quite the same way.

Nobody contributed more to this enterprise over the past thirty years than John Plamenatz; and nobody is more difficult to sum up than John Plamenatz. Although his entire career was passed in Oxford, he always gave the impression of being in but not of that society; he was, of course, a Montaigne by birth, and no doubt his family loyalties made Montaigne more real to him than Oxford could ever be. But he was, I think, more at home in seventeenth-century France than anywhere else, and he looked at the antics of his Oxford colleagues with something of Rousseau's disapproval of Pascal's amazement that men could be so addicted to excitement and self-display. He was extraordinarily recent with everyone but close friends; even when teaching some Latin undergraduate, he was likely to avoid a direct assault on whatever nonsense was turned out as an essay—what I

learnt about Rousseau I learnt in the course of a conversation about life in the countryside, and why he, Plamenatz, had never acquired the art of driving a motor car. The foolishness I had written was tactfully passed over with only a few minor quibbles; its utter inadequacy was allowed to work out for itself. The same reticence did not make for equally successful lecturing; Plamenatz was apt to lecture with his eyes firmly fixed on the page six inches in front of him—so thoroughly did he eschew any attempt to project his personality that he contrived to seem embarrassed by the presence of any audience at all while he worked through what he had written.

Yet he was in many ways a marvellously good critic. He could, certainly, miss the point of what he did not find appealing—"don't think the ever found the English relations to be so sympathetic, even though he did his best to make amends for the excessive hostility of *The English Utilitarians* both in its second edition and in the discussion of Bentham in *Man and Society*. But his great virtue was a relentless urge to make sure that he really understood what someone else was saying. In *Man and Society*, this painstaking approach did much to rescue Hegel from the obloquy of the previous twenty-five years; and it did not do so without appeal to those who think that one needs to swallow Hegel's metaphysics on his terms and in his terminology in order to see into the depths of his social and political thought—but it did not exactly encourage those who think that one needs to discover what, other than verbiage, Plamenatz left out. In this, his last book, there is an entirely characteristic statement of his dislike of the habit of reciting intoxicating phrases as substitutes for thought—but it is better to risk being a shallow critic of Marx than to be seduced by his phrases into the illusion that one understands him; better to remain critically awake while you read him than to be lulled into a false sense of security by his profoundity. Nobody can learn anything from a great thinker, especially one as obscure and difficult as Marx, unless he makes the painful effort of trying to put the master's thoughts into words of his own.

He died last February, while *Karl Marx's Philosophy of Man* was still in press. I suppose one cannot say of a man of 62 that he died young, and one cannot say of a man who had done as much as Plamenatz that he died with his work left incomplete. A man of his calibre, however, who has been so long in the world, can see how untimely his death was. For in the last third of this book we get far more of Plamenatz's own personality, far more relaxed and unbuttoned than in his earlier work. He was likely to avoid a direct assault on whatever nonsense was turned out as an essay—what I

learned about Rousseau I learnt in the course of a conversation about life in the countryside, and why he, Plamenatz, had never acquired the art of driving a motor car. The foolishness I had written was tactfully passed over with only a few minor quibbles; its utter inadequacy was allowed to work out for itself. The same reticence did not make for equally successful lecturing; Plamenatz was apt to lecture with his eyes firmly fixed on the page six inches in front of him—so thoroughly did he eschew any attempt to project his personality that he contrived to seem embarrassed by the presence of any audience at all while he worked through what he had written.

Yet he was in many ways a marvellously good critic. He could, certainly, miss the point of what he did not find appealing—"don't think the ever found the English relations to be so sympathetic, even though he did his best to make amends for the excessive hostility of *The English Utilitarians* both in its second edition and in the discussion of Bentham in *Man and Society*. But his great virtue was a relentless urge to make sure that he really understood what someone else was saying. In *Man and Society*, this painstaking approach did much to rescue Hegel from the obloquy of the previous twenty-five years; and it did not do so without appeal to those who think that one needs to swallow Hegel's metaphysics on his terms and in his terminology in order to see into the depths of his social and political thought—but it did not exactly encourage those who think that one needs to discover what, other than verbiage, Plamenatz left out. In this, his last book, there is an entirely characteristic statement of his dislike of the habit of reciting intoxicating phrases as substitutes for thought—but it is better to risk being a shallow critic of Marx than to be seduced by his phrases into the illusion that one understands him; better to remain critically awake while you read him than to be lulled into a false sense of security by his profoundity. Nobody can learn anything from a great thinker, especially one as obscure and difficult as Marx, unless he makes the painful effort of trying to put the master's thoughts into words of his own.

He died last February, while *Karl Marx's Philosophy of Man* was still in press. I suppose one cannot say of a man of 62 that he died young, and one cannot say of a man who had done as much as Plamenatz that he died with his work left incomplete. A man of his calibre, however, who has been so long in the world, can see how untimely his death was. For in the last third of this book we get far more of Plamenatz's own personality, far more relaxed and unbuttoned than in his earlier work. He was likely to avoid a direct assault on whatever nonsense was turned out as an essay—what I

learned about Rousseau I learnt in the course of a conversation about life in the countryside, and why he, Plamenatz, had never acquired the art of driving a motor car. The foolishness I had written was tactfully passed over with only a few minor quibbles; its utter inadequacy was allowed to work out for itself. The same reticence did not make for equally successful lecturing; Plamenatz was apt to lecture with his eyes firmly fixed on the page six inches in front of him—so thoroughly did he eschew any attempt to project his personality that he contrived to seem embarrassed by the presence of any audience at all while he worked through what he had written.

Yet he was in many ways a marvellously good critic. He could, certainly, miss the point of what he did not find appealing—"don't think the ever found the English relations to be so sympathetic, even though he did his best to make amends for the excessive hostility of *The English Utilitarians* both in its second edition and in the discussion of Bentham in *Man and Society*. But his great virtue was a relentless urge to make sure that he really understood what someone else was saying. In *Man and Society*, this painstaking approach did much to rescue Hegel from the obloquy of the previous twenty-five years; and it did not do so without appeal to those who think that one needs to swallow Hegel's metaphysics on his terms and in his terminology in order to see into the depths of his social and political thought—but it did not exactly encourage those who think that one needs to discover what, other than verbiage, Plamenatz left out. In this, his last book, there is an entirely characteristic statement of his dislike of the habit of reciting intoxicating phrases as substitutes for thought—but it is better to risk being a shallow critic of Marx than to be seduced by his phrases into the illusion that one understands him; better to remain critically awake while you read him than to be lulled into a false sense of security by his profoundity. Nobody can learn anything from a great thinker, especially one as obscure and difficult as Marx, unless he makes the painful effort of trying to put the master's thoughts into words of his own.

He died last February, while *Karl Marx's Philosophy of Man* was still in press. I suppose one cannot say of a man of 62 that he died young, and one cannot say of a man who had done as much as Plamenatz that he died with his work left incomplete. A man of his calibre, however, who has been so long in the world, can see how untimely his death was. For in the last third of this book we get far more of Plamenatz's own personality, far more relaxed and unbuttoned than in his earlier work. He was likely to avoid a direct assault on whatever nonsense was turned out as an essay—what I



John Plamenatz

although *Karl Marx's Philosophy of Man* ends with an entirely unequivocal condemnation of Marx's intellectual conservatism, it is far less tactful and irritated than, say, *German Marxism and Russian Communism*. One often gets the impression that Plamenatz thinks better of Hegel and Rousseau as analysts of bourgeois society than he does of Marx—but one never gets the impression that he judges by the standards of Hegel and Rousseau to judge by the highest possible standards.

Karl Marx's Philosophy of Man is, in outline, an attempt to spell out Marx's theory of alienation—under certain assumptions. That is, Plamenatz does not want to say either that Marx's early writings represent the "essential" Marxism or that they are juvenile work, abandoned once Marx began to understand the real difficulties involved in analysing capitalist societies. He wants to raise such problems as the way the claim that the state is a form of alienated life is supposed to fit in with the claim that it is an instrument of class rule, a condition of class rule, an essential part of the capitalist system, and so on. He proceeds on the assumption that Marx does not abandon the doctrine of alienation but rather spells out the mechanisms of an alienated existence in terms of the ideological, religious, political and economic functions of capitalist industrial society.

He starts off on this task by distinguishing his approach from that

of J.Y. Calvez's *La pensée de Karl Marx*; in effect, Calvez was asking whether Marx's humanism provided an adequate faith for men to live by. Plamenatz asks whether there is any good reason to believe Marx's account of the causes and effects of alienation. It is Marx the sociologist rather than Marx the humanist who provides the main target for this inquest.

So scrutinized, Marx comes out looking rather commonsensical—but common sense is often out of look "equivocal or confused" rather more often than we might have expected. Thus, Marx was no doubt right to insist that in industrial societies workers were exploited by capitalist employers whose ownership of the means of production gave them a bargaining power so much greater than that of unorganized labour, and he was no doubt right to point out what monstrous and unsatisfying jobs most manual workers were condemned to do; and certainly some sort of monopoly at any rate are distinctively the result of industrial rather than pre-industrial methods of production. But, how are we to leap from this condition into a realm of freedom where men are neither exploited, nor under certain assumptions, are forced to renounce the material and cultural abundance which industrialization has made possible? A commonsensical listing of our current miseries is no way to prove that there is a simple way to cure all of them simultaneously.

Throughout the book, Plamenatz is harsh on Marx's often too ready propensity for claiming that his theories were "scientific" because they predicted the inevitable downfall of capitalism and the equally inevitable arrival of communism, but not "Utopian" because they did not spell out in any detail either how the collapse would occur or how the society which arose thereafter would be organized. Again, Marx's view of revolution and of its aftermath is far too ready, too roughly handled; Plamenatz agrees that Marx was an extremely shrewd commentator on the mechanics of gaining and keeping power, on the alliances to be made and broken, but he does not think that Marx's analysis of the proletariat were unrealistic on one reading of the proletarian condition, and unnecessary on the alternative reading. If a class arose whose wrongs were a universal wrong and which suffered totally inhuman treatment, its members might have good reason to rebel, but they would hardly have the ability to make the disciplined, clear-sighted revolution which Marx had in mind for them; but a proletariat which began to organize itself in the way Marx envisaged would soon become formidable enough for the existing ruling elite to have to take it into account; the mass of the proletariat could hardly be organized as a clandestine party, and once it was organized openly, it could more

readily achieve its goals through orthodox politics than through revolution. The ambivalence about proletarian politics is evident in Engels's later years was not a failure of nerve but the following through of the logic of the theory he and Marx had set up. Plamenatz's own reflections on what is and is not plausibly laid at the door of bourgeois society defy a quick summary. He is sympathetic to the frame of mind which led writers like Marx to complain of the inhuman conditions of the poor and powerless, and up to a point he is sympathetic to what lies beneath talk of creating a "truly human" world. But he does not care for the language in which it is expressed nor for its apparent implications—for him a tribal society cannot sensibly be said to be less truly human than an industrialized society, and he gives a pretty bleak account of the chances of a persuasive theory of "moral progress" such as he rightly thinks we should need to fill out this talk of an approach to the truly human condition. The elements of the radical critique of bourgeois society are taken, piece by piece, quite gently, but quite firmly; in essence, Plamenatz reiterates some familiar liberal anxieties about both diagnosis and cure—suggesting it is true that we are in some sense more isolated in bourgeois society than in other societies how much sense of the diversity of individual existences would be lost if we attempted to diffuse the intimacy we now reserve for close friends throughout our social relationships? Supposing it is true that we now rely on a professionally administered legal system to cope with conflicts of interest and disputes over rights, would we be better off with no formalized authority, no professional lawyers and judges, only interested norms and a popular consensus backing them?

To such questions, Plamenatz returns to very clear answer of his own; the point of asking them, in this context, is to insist on Marx's carelessness in raising large issues which he does not feel that he is making sweeping accusations which raise questions he does not stop to answer. Marx's assault on bourgeois society "does as much to corrupt as to enlighten his readers. He makes them feel that there is a great deal wrong with society and the human condition as they are, without making it clear to them just what it is, and above all without providing them with realistic and coherent principles to guide them in their efforts to set it right. And his excuse for this negligence, his claim to be scientific and not Utopian, is shoddy and evasive. It is as if he were pointing with one hand in the direction in which he wanted men to go and with the other was throwing dust in their eyes."

Alan Ryan

The good philosophy guide, and the philosopher

A History of Greek Philosophy: volume IV—Plato, The Man and his Dialogues, Earlier Period
by W. K. Guthrie
Cambridge University Press, £12.00
ISBN 0 521 20002 4
The Collected Dialogues of Plato
edited by Edith Hamilton and Huntington Cairns
Princeton University Press and Oxford University Press, £5.95
ISBN 0 691 09718 6

The earlier volumes of Professor Guthrie's *History* have been widely praised, and in this one, too, he exhibits his remarkable gifts of scholarship and exposition. But here, dealing with Plato's dialogues, up to and including the *Republic*, he faces for the first time the problem of writing about a philosopher whose works have survived so that we may read them for ourselves. In this volume he is very nearly complete in his task, and if made available cheaply, could take the place occupied so long by A. E. Taylor's *Plato: The Man and his Work*. Like Taylor, Guthrie thinks, not out of arrogance,

claims to have produced no more than a "Good Food Guide" to Plato, which is not a substitute for actually reading the dialogues, but it is much more than that; for the dialogues are far from self-explanatory, and since at least the first century BC scholars have been writing commentaries to explain them.

Guthrie is a guide not only to Plato, but also to his more recent commentators, marshalling his material with skilful economy to tell for what has been said on a particular problem, whether it is a question of language, and finally, what Guthrie himself believes.

Because of the plan of the *History* the reader who wants all that Guthrie has to say about Plato will need not only this volume and its two successors but also the volume three, which contains a full study of Socrates and discussions of a number of sophists who appear in the dialogues and for whose views Plato is an important witness. But this volume is very nearly complete in its task, and if made available cheaply, could take the place occupied so long by A. E. Taylor's *Plato: The Man and his Work*. Like Taylor, Guthrie thinks, not out of arrogance,

Guthrie has chapters on Plato's life and writings, followed by a separate study of each dialogue, with a full summary and a discussion.

Not only has his more space, and an extra half century of scholarship behind him, he has also a far more satisfactory view of the development of Plato's philosophy, and of the theory of forms in particular, than Taylor had. Guthrie is able to trace its development from its earliest dialogues through a series of stages, and to show at each stage how later developments and difficulties are implicit in what is said, although they were certainly not consciously present in Plato's mind. For this alone his work is worth having; but it is only a small part of the whole. The interpretation of a single sentence may be a question of chronology, time, and even Plato's personality, are all occasions for him to say something new and interesting.

Guthrie found himself led more and more to interpret Plato in the light of a single sentence, and the question why Plato agreed in his old age, to undertake the unpromising task of educating Dionysius II of Syracuse. He did so, Guthrie thinks, not out of arrogance,

not even primarily because he felt he ought to accept any opportunity that came his way to put his views about philosopher-kings into practice, but because of his "pathetic and mistaken shame" at the thought of failing to meet a challenge to action, and his personal attachment to Dionysius's mentor, Dion.

Having once agreed to go, Plato was no match for Dionysius, who was ignorant but also charming and witty, and outmanoeuvred him at every turn. Even now he was "still somewhat of a political innocent," displaying the same unworried characteristics which had earlier prevented him from ever taking an active part in politics in Athens.

In other respects the picture of Plato and his thought that Guthrie presents is very similar. It is the one which would be obtained by an intelligent man with some knowledge of the Greek background who was reading Plato for pleasure. Guthrie found himself led more and more to interpret Plato in the light of a single sentence, and the question why Plato agreed in his old age, to undertake the unpromising task of educating Dionysius II of Syracuse. He did so, Guthrie thinks, not out of arrogance,

but it is unlikely that any really eccentric view of what Plato was trying to do in his career. Guthrie's views are, therefore, usually moderate, though he is not afraid of confessing himself puzzled by the *Menexenus* or of referring to the *Lysis* as a failure, enabling the masterpieces, on the other hand, to speak for themselves.

After the "Good Food Guide", the food itself is now available all together in an attractive form in a well-produced volume, *The Collected Dialogues of Plato*, which weighs less than three pounds and is under two inches thick. It contains, in full, standard translations of all of Plato's works generally agreed to be genuine, and a few doubtful ones. In addition there is a very useful index of well over a hundred pages. The volume was originally published in the United States in 1961, and the translations do not therefore include anything very recent. Indeed, fewer than a dozen of the dialogues are well represented. The short notes and introductions are also rather dated, but for handy reference it is admirably adapted to its purpose.

P. M. Huby

BOOKS

Forever on the dole

Will there be room to play?

J. Alan Patmore

Factories on the march

to "the coefficient of multiple determination, R^2 ". Or has the author more seriously, indeed, his computer, and the coefficients really are only ones of correlation? Again, why so relatively little reference to the numerous technical problems associated with regression and correlation, notably, spurious autocorrelation, of random and systematic variation, of cross-correlation, etc. in this series? Without this, it is difficult to be entirely confident of the explanatory power of the analyses. And, finally, the specification and choice of variables, the inclusion of new towns and assisted areas measures, or omission of industrial development certificates (IDC) controls, in the national time series study, are some would say, question certain judgments. The Greater London Council, for example, would certainly not agree that maintaining London at its "planned population" will necessitate a continuing "high rate of industrial overspill".

Since this book is a stimulating and original contribution to the field, the author would be well advised that his statistical findings should be taken more as pointers than definitive conclusions on this very interesting topic.

David Keeble

David Keeble

B. A. Corry

Wages of capitalism

These are placed in a world with perfect markets, no uncertainty, no entrepreneurial activity, no unemployment, proportional taxes, no labour frictions and unhindered borrowing and lending with equal returns. The world is seen as a perfectly functioning free market economy. They maximize utilities, wages and other stochastic conditions being assumed to remain unaffected by the set of decisions that emerge. And the simulation generates a distribution of income and lifetime income. Subsequently, an equal distribution of family incomes artificially like that of the United States is generated.

Al. James Blinder seems to confuse analysis of simulation results with that of the real world phenomenon. The exogenous distribution accounts overwhelmingly for the simulated inequality. The micro model, however, cannot answer the question, given any respect to the factors, it does consider, and it explains very little. But even if it were tenable with respect to what it includes it would not be the only possible model. The model factors are not the only factors. Virtually everything that could impact symmetrically to differential inheritance is excluded: moderate inequality from unequal wages;

Cromwellian motives

was to view foreign

Good husbandry, bad debts

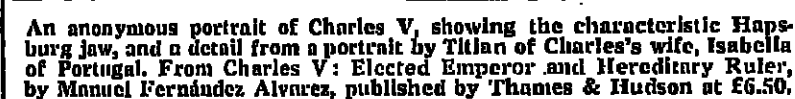
For some of the period his estates were owned by two nephews, Thomas Coke, first earl of Leicester, who succeeded to the property at the age of 30 in 1707, and died in 1759, and his great nephew, Thomas William Coke, who succeeded to the estates in 1767 and died in 1842. The large estate came mainly from the marriage of the first earl's daughter, Countess of Leicester, with a baronet, John Coke, of the Crown of the day, payable by inward and outward bound shipping which passed Dutch goods, lighthouses, Parker described his estates as "the most fertile in the county." Thomas Coke helped his tenants increase their output (and in the long run raised his rents), by contributing to the building of a canal and fencing newly enclosed land, by providing good farm buildings and by providing good farm

vision of large portions for his daughters on their marriage. Though money was spent on farm buildings and land purchase, no investments were made outside the estate. None of the Cokes' income was used for production of goods or communications, trade or manufacturing. As Parker says in a brief conclusion about both the Cokes: "they ought to have been more able than many great landowners to avoid borrowing, but their extravagant mode of life prevented it. Their estate did not help them. The country was in a depression, commerce and industry it was rather the other way round—capital flowed towards the estate, not away from it."

Double-think

O'Farrell can provide no answer but he does draw attention to the important aspects of the Irish Question, so strangely a part of English politics once again. There are drawbacks to his study I regret the absence of detailed references to the Irish literature of the period and there are occasional egotisms as his eclectic bibliography has some surprising omissions. But his treatment is scholarly and thoughtful, his contribution synthesizing much that is new in Irish historiography. It is an help to the reader's understanding of the present, it tending to remind us to its short-term intractability.

D. W. COLE



Urban growth industry

Edmund King

Paper chases

But there is a negative side to the question which can be equally important. Those who have had to do it know well enough the drudgery involved in tracking down the remains of the great and the collector. Hitler's bombs put an end to all relevant records during the blitz. To that extent it is as useful to know (opening the book at random) that General Sir Percy Forster was a decorated officer, his name in a fire or it is to be told that Vice-Admiral Sir Powell Bartschels was a decorated officer. The Railway Wrecker William Powelton retains some diaries and press cuttings.

It follows that no research history ought to be without these guides. Their cost will quickly be recovered from the postal charges which future researchers will not mind, thanks to Dr Cook and his team.

Michael Bentley

Michael Bentley

BOOKS

From the rationals to the reals

R is for Real
by David Wheeler
The Open University Press, £1.95
ISBN 0 335 05600 8

The title, *R is for Real*, evokes buried memories of the nursery process of learning the building blocks of written language. The title is deliberate and the implied paradox profound: the real numbers are the subject-matter of elementary mathematics, but they are not acquired in any way which is remotely analogous to the process of learning the alphabet. David Wheeler maintains that the real numbers are not usually taught in schools although they are present throughout school mathematics. He writes for mathematics teachers at O level and beyond, for those "who have not previously encountered any explicit discussion of real numbers, and as a refresher for those who have forgotten much of what they once studied because it is not part of their regular engagement with mathematics".

Should the explicit study of the real numbers form part of the regular engagement of school mathematics? *R is for Real* urges teachers of mathematics in schools to examine this question for themselves. The purpose of the book is not to provide answers, but to ask the age-old questions about numbers in a way which will be intelligible to teachers whose knowledge of mathematics is not profound, and which will provoke them into a reconsideration of

what they say to pupils about numbers. The author also hopes that the reader will be "put into a position to delve intelligently into more comprehensive and difficult books".

The author speaks directly, and at first simply, to the teacher on classroom matters which secondary teachers often discuss with children: quadratic equations and surds, recurring decimals and "endless sequences of additions", π and the number line. From these starting points he leads on to the inadequacy of the rationals as the number system of elementary mathematics, and proceeds to the construction of the reals. The construction is the usual one: the integers are equivalence classes of ordered pairs of natural numbers subject to rules of addition, multiplication and order.

Similarly, the rational numbers are equivalence classes of ordered pairs of integers, and finally, the real numbers are equivalence classes of Cauchy sequences of rational numbers. The construction is well motivated and broken up by discussion of such matters as incommensurability, the golden section and Archimedes' method of exhaustion. Mention is also made of Dedekind cuts of the rationals as an alternative construction of the reals. The treatment is informal and descriptive, founded on intuitive knowledge of the counting numbers. Wheeler sees operations on counting numbers as generalizations from the experience of young children:

Although it is possible to prove rigorously that the addition of counting numbers is commutative and associative, it is undoubtedly easier to argue for the reasonableness of these generalizations

from a basis of the application of counting to sets of discrete objects.

He then describes the construction of the integers and the rationals out of the natural numbers, so as to produce systems which are closed under subtraction and under division (except by zero). He pays lip-service to other ideas about numbers, saying that "It was for their usefulness, not their tidiness, that fractions and negative numbers appeared historically". But this is the only mention of usefulness. Numbers other than counting numbers are for mathematics, not for application. The final construction of the reals is to provide a system which is closed under the process of taking limits of Cauchy sequences of rationals. This construction of the reals to solve an internal mathematical problem may appeal to some teachers for its elegance, but the whole stream of construction suffers from the theoretical flaw that the natural numbers are not put on an axiomatic basis.

But this successive construction of a number system is not the way in which most teachers see their classroom work. They look for aspects of everyday experience, or of earlier mathematical experience, from which pupils can generalize. Rational numbers occur in the classroom as generalizations from experience of measuring and subdividing concrete objects. The equivalence class containing (2,10) and (20,100) is secondary to the practical knowledge that 2 decimetres and 20 centimetres measure the same length (2/10 of a metre or 20/100 of a metre).

A surd such as the square root of 2 may seem to secondary pupils to have rather strange properties, but they do not question its existence

or feel a need to construct it. They know that there are squares with areas 1.96 square units and 2.25 square units. These have sides of 1.4 units and 1.5 units—why should pupils doubt the existence of a number describing the sides of a square with area 2 square units?

Wheeler rejects the view that school mathematics is founded on experience. He says, "Since there is no situation from which zero can be abstracted or to which zero can be attributed, there is nothing we can point to. It achieves its definition essentially from the manipulations or computations that are performed with it; there is no other access to it," and, "Real numbers, for instance, do not exist apart from our attempts to define them. There are no situations in which they could be discovered or from which they could be abstracted." If so, how were they invented or discovered? And how can they be made accessible to children who grasp abstractions with difficulty?

The gap between classroom experience and abstract mathematics is a great one, and this book sounds bravely, if rather uneasily, as it tries to bridge it. In spite of a number of minor errors, and statements which will puzzle well-versed pupils, it deserves to be read and pondered by all those who educate future teachers of mathematics. Will Wheeler's points of view be helpful to teachers in secondary classrooms? If not, we should consider whether there are other ways of helping teachers to rethink their teaching in the light of points which Wheeler makes in his introduction: "there seems to be a conspiracy of silence in classrooms about real numbers... fractions or rational numbers are explicitly and universally 'taught', why then should not real numbers be 'taught'?"

H. B. Shuard

Many-body theory

Hydrodynamic Fluctuations, Broken Symmetry, and Correlation Functions
by Dieter Forster
W. A. Benjamin, Inc., \$19.50
\$13.50

The concept of correlation functions links together distinct physical behaviours of a system containing many interacting particles such as normal modes of excitation, spontaneous random fluctuations, relaxation to equilibrium, and the partition theorem. The latter is achieved by the fluctuation-dissipation theorem, a consequence while the many-body theories are used to calculate these correlation functions, at least in principle, the league the experimentalist means section, a reactivity, a viscosity or the shape of a resonance line.

Dr Forster's excellent book has been written within this perspective. This is not as natural as it may appear, as any reader of many-body textbooks will testify. Moreover, although the fluctuation-dissipation theorem has had a long and successful history, it has never been a central part of the curriculum of a book. There are, of course, several excellent reference books on statistical mechanics, and some outstanding summer school lectures. But these were hardly within easy access of the student and the broad-based physicist, as they are now thanks to this book.

The book is chiefly concerned with application of the correlation function formalism to the hydrodynamic, random walk and Brownian motion. In this regime very simple and general excitation modes—mostly diffusive—emerge due to local conservation of mass, energy and momentum. Alternatively, the spontaneous breaking of symmetry associated with a phase transition. To extract these modes, Dr Forster uses mainly the many-body formalism, which here appears to have a powerful formalism which has never hitherto appeared in book form.

After an attractive introduction on spin diffusion, the book advances skillfully between formal and applied chapters. The application to the normal fluid, phonon motion, ferromagnetic spin waves, liquid helium 4 and nematic liquid crystals are all well presented in a fairly elementary fashion and results obtained are sufficient to be interesting to make cover a good deal of ground. The book will do little to help the student who is not familiar with the formalism, but it is a useful reference for those who are.

In writing a book like this there is always the problem of what to omit. The author was clearly reluctant to omit many things which have resulted occasionally in the appearance of a miscellany rather than a course text. Thus Doppler velocity measurements, the nitrogen laser, and many other things get brief, almost telegraphic descriptions. The book reads rather unevenly and I felt that, while it would be very useful for teachers to read and could sometimes be a handy reference for physicists working in the field, students might find themselves lost in some parts while getting on very well in others.

What, for example, would most undergraduates make of a detailed table of measurements of the speed of light from Rindler to the present day, 18 entries complete with estimates of errors? Material of this kind, belongs in advanced texts, although it is certainly good that the book mentions the recent techniques for determining c in which the frequency of a stabilized laser is compared through several steps with directly measured microwave frequencies. There are plenty of references, and a list of references at the end of the book. The book is a good one, but it is not a course text. It is a reference book, and it is a good one.

W. T. Welford

Nicholas Rivlin

BOOKS

Constructing quantum fields

Introduction to Axiomatic Quantum Field Theory
by N. N. Bogolubov, A. A. Logunov and I. T. Todorov
translated from the Russian by Stephen A. Fulling and Ludmila G. Pappas
edited by Stephen A. Fulling
W. A. Benjamin, £17.90
ISBN 0 805 30982 9

Elementary particle theorists are notoriously changeable. The ideas, techniques and models confronting a graduate student at the start of his studies are frequently very different from those coming into vogue as he finishes three years later. Quantum field theory, in its heuristic forms, is as susceptible to this passage of time as are the more phenomenological aspects of the subject. The construction of quantum fields is a mathematically rigorous way and results obtained within this framework remain valid. One of the first major investigations into this area was focused on the so-called Wightman axioms, specifying properties which the vacuum expectation values of products of field operators should possess. This work reached its climax around the early 1960s and in recent years the attention of mathematically minded theoretical physicists has turned to constructing quantum fields in a more direct way.

The book by Bogolubov *et al* lies firmly in the first camp, and it could perhaps be criticised on the grounds of being rather dated when we are told that initial plans were made at the end of 1960 leading eventually to the appearance of the Russian text in 1965. However, there are only a very few books available which deal with this research area and the breadth of discussion contained within it make this new one well worth waiting for.

Wightman theory rests on the association of a quantum field with an operator valued distribution thus intertwining two major branches of functional analysis. The first part of the book is an exposition of the necessary mathe-

matical techniques. There are chapters on Hilbert spaces, distributions and Fourier transformations, dealt with in a characteristically Russian way. Indeed, the treatment of the subject is clearly modelled on the well-known treatise of Gelfand and his collaborators. In particular, the notion of rigged Hilbert spaces and nuclear spaces are introduced early on and recur. The discussion is reasonably comprehensive but the pace is brisk and non-expert readers will find reference to the cited works by Gelfand and others very useful.

Part two, "The General Principles of Relativistic Quantum Theory", deals with the general axioms of quantum mechanics (in a rigged Hilbert space framework) and the Poincaré group. There is a discussion of the representations of the Poincaré group and the Dirac equation as well as a short appendix on Lie group theory and a proof of Wigner's famous theorem.

Local quantum fields appear for the first time in full generality in the next part which opens with a carefully motivated description of the Wightman axioms for the vacuum expectation values and a proof of the crucial reconstruction theorem. These chapters are completed by the obligatory one in which the free field is exhibited as an example of the preceding structure.

Rather than moving directly to the proof of the famous results of axiomatic field theory (CPT, spin-statistics etc) at this stage the authors put in five chapters on the asymptotic scattering structure of the theory. This includes treatments of both the Haag-Kulshammer-Lessner-Zimmermann (LSZ) asymptotic conditions as well as Bogolubov's own technique using the functional derivatives of the S matrix.

The latter, together with the Kallen-Lehmann spectral representation, is then used to give a short account of renormalized perturbation theory. This part is most valuable as it contains work which is totally absent in the book by Streeter and Wightman and which

only appears very briefly in Jost's book.

Part five contains proofs of the CPT and spin statistics theorem. There is a general discussion of the analytic structure of Lorentz invariant functions and a proof of the technically crucial Bargmann-Hall-Wightman theorem. This section finishes with a short discussion concerning the significance of invariant representations of the canonical commutation relations.

The final part is devoted to a brief account of the C* algebra approach to quantum field theory and a statement of some of the recent results in constructive quantum field theory. This section reads as if it was inserted late in the day as an apology to current trends and I am doubtful about its usefulness.

The scope of this book is considerable and greatly exceeds that of other available texts. The general level of mathematical rigour is not quite as high as that in the treatise of Streeter and Wightman, but a reader with a modest knowledge of mathematics should be able to fill in the odd "e.g." refinement without difficulty. Some translations of Russian text, however, are rather awkward and are difficult to read. This one, however, is entirely free of such defects in a very good translation. It is clear from the introductory remarks that Dr Fulling, the senior translator and editor, was heavily involved in many aspects of the preparation of the English version and the thanks of the theoretical physics community should be extended to him for undertaking and successfully executing what must have been, at times, an onerous task.

This book, then, is a clearly written exposition of many aspects of "Wightman" theory and, by virtue of its breadth and content, is strongly recommended. In particular, it would form an ideal text for an advanced graduate student seeking to deepen his knowledge of quantum field theory. I would have dearly liked a copy when I was in that position.

C. J. Isham

Filling the gaps

The Elementary Language of Solid State Physics
by M. H. B. Stiddard
Academic Press, £5.40
ISBN 0 12 67 1050 3

Up to the early 1960s the choice of readable texts in solid state physics was remarkably limited, but the past decade or so has produced a veritable literary explosion. In this area now requires special justification. The two volumes reviewed here diagnose very different gaps in the present provision.

The Elementary Language of Solid State Physics is directed primarily at chemists and aims to convert them to Stiddard's own view that solid state physics is far too interesting to be left to physicists. The chemists are not too bothered with a qualitative non-mathematical story, but are given an introduction to the mathematics of the solid state, so that they can move on to appreciate more advanced and comprehensive works such as those by Kittel and Ziman. The main topics analysed are symmetry, the reciprocal lattice, diffraction, the free electron gas, and electrons in periodic potentials. Along with brief discussions of structure in ionic solids, lattices vibrations and impurities. No formal problems are set for the student, but a helpful bibliography is provided at the end of each chapter.

Although some mathematical arguments are set out with greater detail and greater clarity than usual, the presentation is less different from that of a conventional text. It might have been expected, and in places physical insights implied by the mathe-

ematics are inadequately explored. The book is not intended to be complete in itself, and provides a conceptual bridge between qualitative and quantitative explanation. This is a book which could be most useful as supplementary reading.

Real Solids and Radiation is altogether different in spirit. Hughes is keen in itself, and provides a conceptual bridge between qualitative and quantitative explanation. This is a book which could be most useful as supplementary reading.

Real Solids and Radiation is altogether different in spirit. Hughes is keen in itself, and provides a conceptual bridge between qualitative and quantitative explanation. This is a book which could be most useful as supplementary reading.

The solids discussed here fall short of the perfect translational symmetry that is Stiddard's main concern. The first four chapters fairly conventionally deal with the usual topics of defect characteristics, but the remaining five discuss the interaction of particles and "phonon" beams with solids, the creation of defects, recombination problems associated with radiation damage, and applications of radiation effects; these are topics not usually discussed in elementary texts. The style is mainly descriptive with effective use of diagrams and photographs, and very limited reliance on mathematics. What emerges is a highly readable account of a branch of science, which, because of its complexity, has had to blend theoretical concepts with empirical explanation, and which has borrowed ideas from many related disciplines. It not only provides an elementary introduction to the involved and uncoordinated specialist literature on radiation damage, but nicely covers the interdependence of pure and applied science. This worthwhile book may stimulate a little more attention to effects of radiation damage in undergraduate courses.

J. A. D. Matthew

Spirals

Complex Variables
by Herb Silverman
Houghton Mifflin, £9.75
ISBN 0 395 18582 3

The author of this textbook "wishes to create a spiralling effect that will enable the reader to draw from his knowledge of advanced calculus in order to demystify complex variables". I am unable to determine whether he has succeeded—but the book is quite a reasonable introduction to the theory of functions of one complex variable. The usual topics are covered in the usual way with many good examples and undergraduates should find it interesting though not inspiring.

A proof of Cauchy's theorem is based on Green's theorem. Cauchy's integral formula is proved and used to evaluate contour integrals. The maximum modulus theorem and Poisson integral formula are proved and normal families are introduced to prove the Riemann mapping theorem. The author also uses Rouché's theorem to prove Stollé's open mapping theorem. There is a chapter on entire and meromorphic functions, a rather superficial chapter on analytic continuation and a nice chapter on the schlicht class S . The Bieberbach conjecture is introduced and proved for close-to-convex functions.

There is a lack of freshness and novelty about this book. Perhaps these qualities are difficult to achieve in an area which has been mined—not to say undermined—by so many previous authors. But this is a safe book to leave in the hands of undergraduates.

J. M. Anderson

Oxford Physics Series

Five forthcoming titles

The Properties of Nuclei

G. A. Jones

This book describes the properties of nuclear levels, starting with stable states and progressing, via quasi-stable states (radio-active ground states and nucleon-stable excited states) to unstable (nucleon-emitting) states. £4

Atomic Nuclei and their Particles

E. J. Burge

An historical introduction to this fascinating subject is followed by discussions on the use of alpha particles in studying the nucleus, nuclear accelerators, nuclear instruments, and experimental methods, and nuclear reactions, forces, and models. £4 paper covers £1.95

Optics

W. T. Welford

The chief aims of this book are to show how the properties of light fit into the general scheme of physics, and to explain the principles of optical instruments—the basic tools of science. £4 paper covers £1.95

Cosmology

Michael Rowan-Robinson

Here is the up-to-date introduction to cosmology that will open the door to this exciting field for science students. The author discusses the formation and evolution of the universe, concentrating on "big-bang" models, with a description of the fireball phase, and comparing the rival theories. £4 paper covers £1.95

The Physics of Semiconductor Devices

D. A. Fraser

The explosive proliferation of semiconductor devices and their increasing use in a wide range of modern equipment make a basic understanding of semiconductor device physics essential for today's courses. This book will provide second- and third-year students with that basic understanding. £4 paper covers £1.95

Inspection copies of these books are available to lecturers wishing to consider them for adoption as required texts. Please write to University Promotion Section, Oxford University Press (THES), Ely House, 37 Dover Street, London W1X 4AH.

THREE PHASES OF MATTER

A. J. WALTON

This undergraduate level text deals with the properties of solids, liquids, and gases at the atomic level. The dominant theme is the extent to which both the structural and transport properties of solids, liquids, and gases are determined by the competing effects of the atoms' kinetic and potential energies. The text stresses the importance of testing predictions in the laboratory, especially those which depart from the accepted theory, and it follows the integrated approach to the subject as developed at the Open University. ISBN 07 084083 8 1978 448pp £5.45 approx. H/C

Inspection copies are available from: The College & University Dept. McGraw-Hill Book Co. (UK) Ltd. Maidenhead, Berkshire SL6 2QL

THE MIT PRESS

128 BUCKINGHAM PALACE ROAD
LONDON SW1W 9SD

The Golden Age of Spanish Painting

A discussion of the exhibition in the Royal Academy by Hugh Thomas is published today in *The Times Higher Education Supplement*. There is also a review by Alan Ryan of John Plamenatz's last book "Karl Marx's Philosophy of Man", as well as a *Dop's Diary* by David Lodge.

Crystals X-rays & Proteins

D. Sherwood

Crystals, X-rays and Proteins presents a complete account of the theory of the diffraction of X-rays by perfect crystals. It is written primarily for chemists and life scientists who need a complete and thorough explanation of the theory of X-ray diffraction, and will also be of interest to those studying the properties of crystals and the molecules which form crystals.

The importance of X-ray crystallography cannot be over-emphasised; of the various methods currently available for studying the structure of the complicated chemicals vital to all living matter, it is this method which stands apart as the only technique which enables information to be obtained down to the atomic level.

This book, which may be used at any post-school level, develops from first principles all relevant mathematical crystallography and wave theory, and assumes no mathematical knowledge beyond elementary integral calculus. It is the complete text for the non-physicist.

Price £12.50 not Cased



Longman

Using its history

Optics and Its Uses

by G. F. Lothian

Van Nostrand Reinhold, £7.50 and £3.95
ISBN 0 442 30098 0 and 30099 9

The teaching of optics in university physics courses in England has changed considerably in the last two decades. The expansion in other directions, in particular in particle physics, at first caused a compression in other subjects and much of the traditional optics material was discarded. Later, interest in the physics of the laser and in the physics that can be done with lasers led to a revival of interest in "modern optics" appeared in the syllabus. However, it seems that there is still uncertainty about the amount and kind of optics that should be taught.

This book is one of the Modern University Physics series, edited by the late Professor G. K. T. Conn, head of the physics department at Exeter. It is based on the course given at Exeter and it assumes as ground-work geometrical optics to A Level. The 15 chapters, covering aberrations, image-forming instruments, spectroscopes, interferometers, polarization, lasers, holography and the velocity of light.

There are useful examples scattered in the text, a short list for further reading and a good index. There are some very pleasing aspects to this book which make it well worth recommending. The author often goes back to original sources; for example, he reproduces some of Michelson's fringe visibility curves of cadmium lines that he also shows a modern Fourier transform spectrometer and some results obtained from it. There could be no better way to being on the historical development of science. Principles are frequently illustrated by detailed diagrams of actual instruments or occasionally

photographs (but, as is usually the case, these are not very informative). The author's own interest in spectroscopic instrumentation sometimes shows through rather clearly.

In writing a book like this there is always the problem of what to omit. The author was clearly reluctant to omit many things which have resulted occasionally in the appearance of a miscellany rather than a course text. Thus Doppler velocimetry gets a one-line mention; likewise, the nitrogen laser, and many other things get brief, almost telegraphic descriptions. The book reads rather unevenly and I felt that, while it would be very useful for teachers to read and could sometimes be a handy reference for physicists working in the field, students might find themselves lost in some parts while getting on very well in others.

What, for example, would most undergraduates make of a detailed table of measurements of the speed of light from Rindler to the present day, 18 entries complete with estimates of errors? Material of this kind, belongs in advanced texts, although it is certainly good that the book mentions the recent techniques for determining c in which the frequency of a stabilized laser is compared through several steps with directly measured microwave frequencies. There are plenty of references, and a list of references at the end of the book. The book is a good one, but it is not a course text. It is a reference book, and it is a good one.

W. T. Welford

ELEMENTS OF ELECTRONICS
FOR PHYSICAL SCIENTISTSR. L. Havill and A. K. Walton
£8.95 hardcover £4.50 paperbackENGINEERING
HEAT TRANSFERJ. R. Simonson
£4.95 hardcover £3.95 paperbackBIOMATHEMATICS:
AN INTRODUCTIONDavid Machin
April, about £2.95

BASIC MATRICES

C. S. Broyden
£8.95 hardcover £3.95 paperbackA FOUNDATION COURSE IN
MODERN ALGEBRAD. J. Bonnet
£2.95GRAPH THEORY WITH
APPLICATIONSJ. A. Bondy and U. S. R. Murty
£11.50MATHEMATICS
FOR CHEMISTSD. M. Hirst
April, about £2.95Three specialist books, by RHYNS LEWIS,
for electrical, electronic and telecom-
munications students.FIRST YEAR
TECHNICIAN MATHEMATICS

£1.95

SECOND YEAR
TECHNICIAN MATHEMATICS

£2.45

THIRD YEAR
TECHNICIAN MATHEMATICS
WITH APPLICATIONSApplications cover fourth year work
Mar, about £2.95For further details please write to:
Anne Colwell, The Macmillan Press,
Little Essex Street, London WC2R 3LP.

M. MACMILLAN PRESS

POPULAR LECTURES IN
MATHEMATICSThis series, translated and adapted
from the Russian, makes available
some of the best mathematical
literature of the Soviet Union. The
lectures are intended to introduce
various aspects of mathematical
thought and to engage the student
in mathematical activity which will
foster independent work. Some of
the lectures provide an elementary
introduction to certain non-
elementary topics while others pre-
sent mathematical concepts and
ideas in greater depth.

Inversions

I. A. Bakel'man
226 03499 2 £1.80

Number Systems

S. V. Poincaré
226 25669 3 £1.50The Application of Mechanics to
GeometryB. Yu. P. m.
226 45016 3 £1.80

What is Distance?

Yu. A. Shreider
226 75498 7 £1.80

The Monte Carlo Method

I. A. Stepanov
226 76749 3 £1.80

Pascale's Triangles

V. A. Uspekii
226 73416 5 £1.50University of Chicago Press
126 Buckingham Palace Road
London SW1W 9SDThe English
of bureaucratsThe bureaucratic language of
statements about universities is
criticized in The Times Higher
Education Supplement this week
by Ian Robinson, who starts a
regular column. There is also
a special section reviewing
mathematics and physics books.

A leader by example

The Development of X-ray Analysis
by Sir Lawrence Bragg
edited by D. C. Phillips and H.
Lipson
Bell, £6.50
ISBN 07135 16887Sir Lawrence Bragg had almost
completed this book at the time of
his death in 1971. The work of
completion, which involved some
rearrangement of the later
chapters and revision of diagrams,
as well as proof reading, has been
done by two of his former colleagues,
Professors D. C. Phillips and
H. Lipson. The result is a book of
considerable interest and charm,
not a text book but a species of
scientific autobiography and history
of X-ray crystallography, so
that it is scarcely possible to
review it without at the same time
reviewing some of Bragg's achieve-
ments as a scientist.The book begins with the discov-
ery of X-rays by Röntgen in 1895,
and Bragg's experiments on the
scattering of X-rays which showed
the characteristic polarization
effects of electromagnetic waves.
The author's father, Sir William
Bragg, had, however, obtained
equally convincing evidence of the
particle nature of X-rays (a contra-
diction of quantum theory) and
Bragg's first paper was
entitled "The diffraction of short
electromagnetic waves by a crystal".
He wished to leave open
the possibility that both waves and
particles were present in an X-ray
beam.It was the discovery of the dif-
fraction of X-rays by a crystal, by
von Laue and his colleagues in
1912, that shaped the course of
Bragg's life. Readers will find the
second chapter particularly inter-
esting in which he describes the
development of the ideas that en-
abled him to reinterpret the Laue
photographs of zinc sulphide, for-
mulating "Bragg's Law" in the
process, and go on to make the
first complete crystal structure
determinations, of KCl, KBr and
NaCl. It provides a classic example
of physical insight, involving as it
did ideas picked up from C. T. R.
Wilson's lectures on physical optics
and the theory of crystal structure
put forward by Pope and Barlow.At the time Bragg was a
research student in the Cavendish
Laboratory, then led by J. J. Thom-
son. The idea that the Cavendish
has been a centre of continuous
excellence in experimental physics
takes something of a knock inchapter five: "Odd pieces of wood
and assorted tin cans were freely
available, though glass and rubber
tubing, mercury and insulated wire
were jealously guarded and strictly
rationed. There was only one foot
pump for glass-blowing which we
had to share so best we could...
I could never have exploited my
ideas about X-ray diffraction
under such conditions."Bragg left to join his father's
laboratory in Leeds, and for their
subsequent work, which included
confirmation of Bragg's tentative
ideas on X-ray spectra, and several
crystal structure determinations,
they were jointly awarded the
Nobel prize for physics in 1915. It
must be a somewhat awesome
responsibility to begin one's career
with a Nobel prize, but Bragg con-
fined his acknowledgements to a
further figure of the science of X-
ray crystallography which he
founded. Indeed as a recognizably
separate subject and not simply a
technique employed in laboratories
of physics, chemistry, metallurgy,
mineralogy and molecular biology,
it could be maintained that it has
not survived him.His appointment as Cavendish
professor, a post he held from 1938
to 1953 (although effectively his
tenure began in 1945) was
regarded by some as a contra-
versial one—it marked the end of
the Cavendish as the leading school
of nuclear physics research. It is
now clear that he was not one
of the great Cavendish professors,
primarily because of his support
of, and contributions to, work on
the structures of proteins, the excite-
ment of which is recaptured in
chapter 15.Bragg's outlook was that of a
dedicated research worker. He was
a good teacher—the style of his
last book, is as attractive as
ever—but he was impatient of
administration, and he led by
example, not by organization. It
was difficult to interest him in
anything which he was not
already interested in having con-
tributed to it himself, and there
are a few topics which do not fea-
ture in the book which might have
been expected in one of this dis-
tinguished physicist's books. It will
be of interest to everyone who
has been brought into contact, directly
or indirectly, with Bragg's subject,
and there are and will be a great
many of them. Others will find it
of interest as conveying something
of the outlook of a distinguished
scientist, and as a contribution to
the history of science.

William Cochran

Not yet dead and buried

Introduction to Superconductivity
by Michael Tinkham
McGraw-Hill, £10.55
ISBN 0 07 064877 8A few years ago, the publication of
a huge pair of texts on supercon-
ductivity under the editorship of
Professor R. D. Parks led to the
suggestion that they represented
the last nail in the coffin of super-
conductivity as a developing
research topic. It is reassuring to
see in Professor Tinkham's book
just how unclassified that claim has
turned out to be in both industrial
and academic fields. Industrially,
wires have been developed which
can pass time-varying currents
without the appearance of substan-
tial power dissipation on account
of a simple but subtle twisting of
the filaments of superconducting
material in the interior of the wire.
On the more academic side, the
role of thermodynamic fluctuations
in determining the sharp supercon-
ducting transition of both the conduc-
tivity and the magnetic susceptibility
has been extensively studied. It is
a mark of the relevance of Tink-
ham's excellent book that both
these present developments are
effectively covered, with the result
that the text offers a useful intro-
duction to the phenomenon of
superconductivity for the intending
graduate student.

From the conventional obli-

gation, obedience to Bardeen, Cooper
and Schrieffer for a fundamental
understanding of the phenomenon,
the author passes speedily to the
phenomenological Ginzburg-Landau
theory that has turned out to be
consistently useful for the appli-
cations of superconductivity, using
the BCS theory to give values for
coefficients in the Ginzburg-Landau
theory. In the extent of its coverage
of this film superconductivity, re-
search in high-temperature supercon-
ductivity interests in that field, for
the contrast of present develop-
ments in the subject, specifically
discussed, along with his dis-
cussion of the current-carrying
capacity of type-II superconducting
wires, serves to justify his claim to
have produced a text relevant to
industrial physicists as well as pro-
spective graduate students. Perhaps
of more relevance to such physi-
cists, however, might be the
valuable outline of the physics of
the superconducting quantum-inter-
ference devices (SQUIDS) which
open up new horizons of detection
and measurement. Tinkham's use
of SQUIDS to study the fluctuation
effects on the superconducting
transition temperature is a new
development, and the limits of
sensitivity of these devices, a
feature not available in practically
any other text book on the subject.

A. D. C. Grassie

BOOKS

Applied maths

Introduction to Mathematical
Control Theory
by S. Barnett
Oxford University Press, £5.75
ISBN 0 19 850618 9Methods of Optimization
by C. G. Broyden
Wiley, £7.50 and £3.75
ISBN 0 471 91922 5 and 91924 1Basic Matrices
by C. G. Broyden
Macmillan, £8.95 and £3.95
ISBN 333 16692 2The modern emphasis on control
theory really reflects a major
change in our view of applied
mathematics. Mechanics started in
order to make sense of our obser-
vations of the heavenly bodies and
a similar analytical intention—
given the situation, to make a
model which will analyse the behav-
iour—has persisted in the later
developments in mathematical phy-
sics. But mechanics itself, in its
spectacular application to rocket
flights, not to mention many other
features of technology (the chemi-
cal industry, perhaps above all),
and attempts to apply mathematics
in biology and economics all have
the aim of controlling the system to
behave in a preordained manner.Barnett's book could hardly be
bettered for an introduction to the
mathematical theory concentrating
on state-space methods. The first
chapter gives an able summary of
the ideas. The next, quite lengthy,
on matrix algebra has presumably
been inserted for completeness, but
contains nothing not already famil-
iar to anyone beginning matrix
algebra. It is otherwise with the
following one on matrix solutions
of linear systems, where the mathe-
matical shades imperceptibly into that
of linear control. The chapter onstability starts with the
Routh criteria, then Lyapunov
finally a very full treatment of
poincaré. A final chapter deals
with optimal control. There are
hints for solution, with an
appendix on the basic calculus
matrix theory.Walsh's book deals ex-
clusively with optimization without
reference to the variables which
are on the same footing, and are
special control variables.
The Kuhn-Zucker theory for
linear programming is developed
first, and applied to quadratic
programming (Wolfe's algorithm).
Then search and gradient
methods are discussed for gen-
eralized optimization, and the
algorithm for the constrained case. The
simplex set are good ones that give
excessive computation. The
paperback version in particular
good value for anyone who wants
a fairly comprehensive introduction
to the last twenty years in
linear programming.Broyden's book has more in
common with the other two than
the title suggests. Though it
deals with the beginning with mat-
rices, the motivation comes very
much from numerical analysis and
programming. So half the book
deals with basic theory (but the
other half is the practical solution
of linear equations with error anal-
ysis) and the rest with practical
methods for eigenvalues, the
solution of differential equations, the
method of degeneracy in the sim-
plex method, and duality. It is a fast
and elegant treatment which will
be of particular value to sci-
entists and engineers, but is a
good introduction for mathe-
maticians.

C. W. Kilminster

FOUR MORE REASONS
FOR LOOKING TO
ADDISON-WESLEY
WHEN IT COMES TO
TEXT BOOKSSecond Edition
PHYSICS FOR BIOLOGY AND PRE-MEDICAL STUDENTSD. M. Burns & S. G. Macdonald
In the second edition of this successful text, the authors con-
centrate on those topics which are directly relevant to biology and medicine.
The overall aim is to show why an understanding of physics is essential in
modern advances in biology and medicine are to be understood. A back-
ground in algebra and trigonometry is assumed and the elementary calculus
and vector representation needed are developed in the text.
660 pp/110x201 04378 5/£8.30/World Student Series

PHYSICS FOR THE LIFE AND HEALTH SCIENCES

S. G. Macdonald & D. M. Burns
The authors stress that, in a period of rapid technological advance
and biomedical discovery, current applications are quickly outdated and
that an understanding of basic principles is essential for an appreciation of
future advances. An extensive glossary of medical and biological terms,
numerous illustrations, over 500 problems and an excellent bibliography
are also included.
768 pp/110x201 00737 1/£8.30/International EditionFifth Edition
UNIVERSITY PHYSICSF. W. Sears, M. W. Zemansky & H. D. Young
The new fifth edition is intended for science and engineering
students taking a concurrent calculus course. This edition retains the
breadth of subject matter, extensively worked-out examples, chapter-end
problems and its time-tested organization, but also includes some 300 new
problems, bringing the total to over 1400. In addition, the Metric (SI)
system has been incorporated as the principle unit system and the material
on atomic and nuclear physics has been completely revised and extended to
three chapters. There is a new chapter on relativistic mechanics, new
examples and applications for life science, energy and environmental
problems.
768 pp/110x201 00737 1/£8.30/International EditionSixth Edition
UNIVERSITY PHYSICSF. W. Sears, M. W. Zemansky & H. D. Young
The new sixth edition is intended for science and engineering
students taking a concurrent calculus course. This edition retains the
breadth of subject matter, extensively worked-out examples, chapter-end
problems and its time-tested organization, but also includes some 300 new
problems, bringing the total to over 1400. In addition, the Metric (SI)
system has been incorporated as the principle unit system and the material
on atomic and nuclear physics has been completely revised and extended to
three chapters. There is a new chapter on relativistic mechanics, new
examples and applications for life science, energy and environmental
problems.
768 pp/110x201 00737 1/£8.30/International Edition

ELBS Edition available

For more information on the complete range of Addison-Wesley books on
physics and mathematics, please write to:
Addison-Wesley
Publishing Company
West End House, 11 Hills Place
London W1R 2LS. Tel 01-734 8871

BOOKS

Under the microscope

Microscopy of Materials
by D. R. Bower & C. R. Hall
Macmillan, £9.95 and £5.95
ISBN 333 154959 and 187032The authors have succeeded in
bringing together a readable
account of the principles and prac-
tice of many different types of
microscopy at a mathematical level
which will be readily followed by
second and third-year undergrad-
uates in materials science, metal-
lurgy, physics and engineering
science. It concerns instrumen-
tation and the principles of image
formation and image interpretation
following the incidence on solid
specimens of electrons and photons
(excluding optical microscopy).
The methods of field-ion micro-
scopy and field-emission second-
ary ion emission microscopy are
briefly also considered. For
electrons the methods considered
are the scanning electron micro-
scope in the secondary electron
emissive mode in reflection and in
the high-resolution scanning trans-
mission mode of Creve (STEM).
For photons the methods consid-
ered are the scanning electron micro-
scope in the secondary electron
emissive mode in reflection and in
the high-resolution scanning trans-
mission mode of Creve (STEM).
For photons the methods consid-
ered are the scanning electron micro-
scope in the secondary electron
emissive mode in reflection and in
the high-resolution scanning trans-
mission mode of Creve (STEM).The use of these approaches in
relation to the properties of solid
materials—dislocations, bending,
magnetic effects, distribution of
impurities, faults and
precipitates—is made clear and the
book provides a foundation for the
more specialist treatments of
particular methods of microscopy.

R. E. Burge

Interweaving

Molecular Structure: The Physical
Approach, 2nd edition
by J. C. D. Brand and J. C. Speakman
revised by J. C. Speakman and J.
K. Tyler
Edward Arnold, £11.00 and £5.50
ISBN 0 7131 2483 0 and 2491 1The first edition of this book, pub-
lished in 1960, was unusual for its
time. The subject of molecular
structure determination was skill-
fully interwoven with a relatively
rigorous development of quantum
mechanics and an account of the
principles of group theory. I
regarded the result as a notable
achievement: the well as giving a
good introduction to the important
structural techniques, the authors
succeeded in illuminating group
theory and quantum mechanics
more effectively than many ele-
mentary texts on these specific
topics.In the new edition, the authors
emphasized this quality by moving
much of the formal material from
appendices into the body of the
text. This is appropriate, since
most courses contain far more
group theory and quantum
mechanics now than was the case
fifteen years ago. The new mathe-
matical weights of vibrational
levels and on spin-spin coupling in
NMR spectra, is very useful.
The chapter on X-ray diffraction
remains one of the clearest of its
kind, while that on electron dif-
fraction is substantially improved.
There are some minor changes to
ensure that virtually all advanced
undergraduates would profit by
studying the book.Overall, though, I am sorry that
there has not been done to bring
the book up to date. A little effort
in this respect could have made a
useful book into a really fine one.
For instance, it is disappointing to
see that in a chapter on microwave
spectroscopy, a thriving area of
research, all the references to origi-
nal papers are from the 1950s.
Again, the gas phase infra-red
spectra in chapter six appear faintly
comic by modern standards; most
undergraduate practical laboratories
have spectrometers which will do
appreciably better. May we hope for
a new printing before too long,
revised with recent data,
references and diagrams? It would
make all the difference.

Alan Robiette

Reviewers

J. M. Anderson lectures in mathe-
matics at University College, Lon-
don.
Michael Bentley is in the de-
partment of modern and medie-
val history at the University of
Sheffield.
R. E. Burge is professor of physics
and head of the department at
Queen Elizabeth's College, London.
C. W. Chalkin is reader in history
at the University of Reading and
has published The Provincial Towns
of Georgian England: A Study of
the Building Process 1740-1820.
William Cochran is professor of
natural philosophy at the University
of Edinburgh.
Roy Foster lectures in history at
Birkbeck College, London.
D. C. Grassie has written The
Superconducting State and lectures
in experimental physics at the Uni-
versity of Sussex.
P. M. Ruby is senior lecturer in
philosophy at the University of
Liverpool and is author of Greek
Ethics and Plato and Popular
Morality.
C. J. Isham is co-editor of Quan-
tum Gravity—an Oxford Symposium
and is reader in applied mathe-
matics at Kings College, London.
C. W. Kilminster is professor of
mathematics at Kings College, Lon-
don.
Edmund King, author of Peter-
borough Abbey, is senior lecturer
in medieval history at the Uni-
versity of Sheffield.
D. H. Pennington, fellow and tutor
of Balliol College, Oxford, has
published Seventeenth Century
Europe.
Nicholas Rivier lectures in physics
at Imperial College London.
Alan Ryan is fellow of New
College, Oxford.
H. B. Shuard is deputy principal
of Homerton College, Cambridge.
W. T. Welford is professor of
physics at Imperial College, Lon-
don.

Texts in Mathematics

A series designed for mathematical students in their
final year, post-graduate students and research workers.

Editors:

Professor W. N. Everitt of the University of Dundee
Professor A. Jeffrey of the University of NewcastleTHE SPECTRAL THEORY
OF PERIODIC DIFFERENTIAL EQUATIONS

M. S. P. Eastham

Reader in Mathematical Analysis, University of London

The first connected account of a body of results, relating in
particular to eigenvalue and spectral theory, which has been
developed in the Mathematical Journals over the past twenty
years."The book can be strongly recommended to mathematicians
and physicists at post-graduate level who want to reach a
well-worked yet little-known frontier."—Times Higher
Education Supplement. 144pp. £2.50ANALYTICAL METHODS OF
OPTIMIZATION

D. F. Lawden

University of Aston in Birmingham

The scope of this book is essentially that of the classical theory
of the calculus of variations, cast into a form which is most
suitable for application to modern problems of optimizing the
behaviour of engineering systems. 164pp. £3.50THEORY AND APPLICATION
OF THE BOLTZMANN EQUATION

Carlo Cercignani

Institute of Mathematics, The Polytechnic of Milan

A unified approach to recent developments in the fields of
electron transport in plasmas; neutron transport in solids and
plasmas and in nuclear reactors; photon transport in
superfluids and radiative transfer in planetary and stellar
atmospheres. 432pp. £10.50

SCOTTISH ACADEMIC PRESS

Mechanical Design in
OrganismsS. A. Wainwright, W. D. Biggs, J. D. Curry
and J. M. GoslineThe first review of biological structural materials
and their mechanically important features using
the approach of the mechanical engineer and the
materials scientist.

Publication January Cloth £8.50 net

Plant Virology

The Principles

A. J. Gibbs and B. D. Harrison

An exposition of plant virology suitable for both
plant pathologists and molecular biologists. Using
a modern classification of plant viruses, the
authors describe the framework of existing
knowledge and outline current research methods.
Publication April Cloth £16.00 netChemistry of the
Atmosphere

Murray J. McEwan and Leon F. Phillips

An introduction to the chemistry of the
atmosphere for those with a background in
chemistry or chemical physics.
Cloth £9.75 net

Molecular Structure

The Physical Approach

J. C. D. Brand, J. C. Speakman and
J. K. TylerSecond Edition Revised by J. C. Speakman and
J. K. TylerA general account of the application of physical
methods to the analysis of molecular structure.
Cloth £11.00 net Paper £5.50 netEdward Arnold
25, Hill Street, London W1K 8LL

son, failing to understand the
importance of the situation, with
the names of three referees should
be received not later than 1st
March, 1976, by the under-
signed, from whom further
information may be obtained.
(Candidates overseas may send
one copy only by airmail.)
Quote Ref. BUL/67/1976
The University, Box 147, Liver-
pool, L69 3BB.

Universities continued

THE OPEN UNIVERSITY

LECTURESHIP IN EDUCATION
Applications are invited for a Lectureship in the Department of Education, Open University, Milton Keynes MK7 9AN. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Open University, Milton Keynes MK7 9AN.

THE OPEN UNIVERSITY

RESEARCH COUNSELLOR
Applications are invited for a Research Counsellor in the Department of Education, Open University, Milton Keynes MK7 9AN. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Open University, Milton Keynes MK7 9AN.

READING

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Reading University, Reading RG1 2AA. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Reading University, Reading RG1 2AA.

READING

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Reading University, Reading RG1 2AA. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Reading University, Reading RG1 2AA.

SHEFFIELD

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Sheffield University, Sheffield S10 2TN. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Sheffield University, Sheffield S10 2TN.

STRATHCLYDE

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Strathclyde University, Glasgow G4 0BA. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Strathclyde University, Glasgow G4 0BA.

SHEFFIELD

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Sheffield University, Sheffield S10 2TN. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Sheffield University, Sheffield S10 2TN.

SOUTHAMPTON

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Southampton University, Southampton SO9 4NH. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Southampton University, Southampton SO9 4NH.

TANZANIA

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Tanzania University, Dar es Salaam. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Tanzania University, Dar es Salaam.

TRINIDAD

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Trinidad University, Port of Spain. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Trinidad University, Port of Spain.

TRINIDAD

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Trinidad University, Port of Spain. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Trinidad University, Port of Spain.

SHEFFIELD

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Sheffield University, Sheffield S10 2TN. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Sheffield University, Sheffield S10 2TN.

STRATHCLYDE

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Strathclyde University, Glasgow G4 0BA. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Strathclyde University, Glasgow G4 0BA.

SHEFFIELD

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Sheffield University, Sheffield S10 2TN. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Sheffield University, Sheffield S10 2TN.

SOUTHAMPTON

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Southampton University, Southampton SO9 4NH. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Southampton University, Southampton SO9 4NH.

TANZANIA

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Tanzania University, Dar es Salaam. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Tanzania University, Dar es Salaam.

TRINIDAD

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Trinidad University, Port of Spain. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Trinidad University, Port of Spain.

TRINIDAD

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Trinidad University, Port of Spain. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Trinidad University, Port of Spain.

SHEFFIELD

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Sheffield University, Sheffield S10 2TN. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Sheffield University, Sheffield S10 2TN.

STRATHCLYDE

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Strathclyde University, Glasgow G4 0BA. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Strathclyde University, Glasgow G4 0BA.

UNIVERSITY OF OXFORD

BRASENOSE COLLEGE
PLATNAUER JUNIOR RESEARCH FELLOWSHIP
The College proposes to elect a Platteau Junior Research Fellow with a view to the study of the history of the College. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Brasenose College, Oxford.

ST. CATHERINE'S

COLLEGE, OXFORD
Research Fellowship
In Contemporary European Studies
Post-doctoral or equivalent experience
Duration: Three years
Salary scale: £3,252 to £4,080
Closing date for applications: March 1 1976
Particulars from The Master, St. Catherine's College, Oxford
Interviews for those short-listed on Wednesday March 17

OXFORD

ST. HUGH'S COLLEGE
Application is invited for the following postgraduate award:
DAME CATHERINE FULFORD SENIOR SCHOLARSHIP
St. Hugh's College proposes to elect a Dame Catherine Fulford Senior Scholar. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, St. Hugh's College, Oxford.

LEICESTER

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Leicester University, Leicester LE1 7RH. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Leicester University, Leicester LE1 7RH.

LEICESTER

THE UNIVERSITY
Applications are invited for a Lectureship in the Department of Education, Leicester University, Leicester LE1 7RH. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Leicester University, Leicester LE1 7RH.

LONDON

MIDDLESEX POLYTECHNIC
LECTURESHIP IN SENIOR LECTURESHIP IN ACCOUNTING
The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Middlesex Polytechnic, London.

LONDON

MIDDLESEX POLYTECHNIC
LECTURESHIP IN SENIOR LECTURESHIP IN ACCOUNTING
The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Middlesex Polytechnic, London.

Leeds

POLYTECHNIC
Department of Life Sciences
LECTURESHIP IN NURSING
To teach on the B.Sc. (Nursing) Course and the Diploma in Nursing (London University).

Applicants must be State Registered Nurses with a minimum qualification. Experience and qualifications in the community health field will be an advantage in this post.
Salary Scale:
Lecturer II: £3,279-£4,083 (with a possible extension to the Senior Lecturer scale: £5,031-£5,966 (bar) £6,417)
Commencing salary according to qualifications and experience.
Details from:
The Academic Officer, (N.13) Leeds Polytechnic, Calverley Street, Leeds LS1 3HE 0532 41101
Closing Date: 20th February, 1976.

THE POLYTECHNIC

HUDDESFIELD
Department of Textile Industries
Re-Advertisement
PRINCIPAL LECTURER/ SENIOR LECTURER
ACA/72
Applications are invited for a Lectureship in the Department of Textile Industries, Huddersfield Polytechnic, Huddersfield HD1 1BA. The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Huddersfield Polytechnic, Huddersfield HD1 1BA.

NOTTINGHAM

THE POLYTECHNIC
DEPARTMENT OF EDUCATION
LECTURESHIP IN SENIOR LECTURESHIP IN ACCOUNTING
The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Nottingham Polytechnic, Nottingham NG4 0DD.

LONDON

MIDDLESEX POLYTECHNIC
LECTURESHIP IN SENIOR LECTURESHIP IN ACCOUNTING
The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Middlesex Polytechnic, London.

LONDON

MIDDLESEX POLYTECHNIC
LECTURESHIP IN SENIOR LECTURESHIP IN ACCOUNTING
The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Middlesex Polytechnic, London.

MANCHESTER

THE POLYTECHNIC
DEPARTMENT OF ART AND DESIGN
SENIOR LECTURER/ SENIOR LECTURER
The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Manchester Polytechnic, Manchester M1 2BT.

STRATHCLYDE REGIONAL COUNCIL

DEPARTMENT OF EDUCATION
FURTHER EDUCATION
All applicants should have relevant industrial or commercial experience where appropriate. Teacher training would be an advantage, but training will be provided on an in-service basis if necessary.
LECTURERS
College: Glasgow College of Technology, North Hanover Place, Glasgow G4 0BA

Subject: Ophthalmic Optics
Grade of Post: Lect. "A"
Requirements: Ophthalmic graduates holding professional qualifications and registration. Should have an interest in the clinical ophthalmic study area and/or in visual optics. The lecturer will teach to Honours degree level in Ophthalmic Optics and will be encouraged to read for a higher degree.
Salary Scale:
Lecturer II: £3,279-£4,083 (with a possible extension to the Senior Lecturer scale: £5,031-£5,966 (bar) £6,417)
Commencing salary according to qualifications and experience.
Details from:
The Academic Officer, (N.13) Leeds Polytechnic, Calverley Street, Leeds LS1 3HE 0532 41101
Closing Date: 20th February, 1976.

MANCHESTER

THE POLYTECHNIC
DEPARTMENT OF EDUCATION
LECTURESHIP IN SENIOR LECTURESHIP IN ACCOUNTING
The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Manchester Polytechnic, Manchester M1 2BT.

NOTTINGHAM

THE POLYTECHNIC
DEPARTMENT OF EDUCATION
LECTURESHIP IN SENIOR LECTURESHIP IN ACCOUNTING
The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Nottingham Polytechnic, Nottingham NG4 0DD.

LONDON

MIDDLESEX POLYTECHNIC
LECTURESHIP IN SENIOR LECTURESHIP IN ACCOUNTING
The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Middlesex Polytechnic, London.

LONDON

MIDDLESEX POLYTECHNIC
LECTURESHIP IN SENIOR LECTURESHIP IN ACCOUNTING
The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Middlesex Polytechnic, London.

MANCHESTER

THE POLYTECHNIC
DEPARTMENT OF ART AND DESIGN
SENIOR LECTURER/ SENIOR LECTURER
The successful candidate will be responsible for the development of the Department of Education, and will be expected to contribute to the teaching of students. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, Manchester Polytechnic, Manchester M1 2BT.

RIHE

The Roehampton Institute of Higher Education is a new institution of 3,000 students and 300 staff comprising four colleges in S.W. London
DIGBY STUART COLLEGE (Roman Catholic)
SOUTHLANDS COLLEGE (Methodist)
THE FROEBEL INSTITUTE (Udenominational)
WHITELANDS COLLEGE (Church of England)

Applications are invited for the post of **HEAD OF THE EDUCATION DEPARTMENT** (Grade VI, 1975 Pelham scale, salary £8,037-£8,913) from 1st September, 1976, at **SOUTHLANDS COLLEGE**
Internal London University degree courses are offered for the Ordinary and Honours B.Ed., and B. Humanities which may include Education. There is one University in-service Diploma course (with several others under discussion), a Post-Graduate course for 100 students, and Part II B.Ed. work covering seven disciplinary options. The target number of teacher places for the College in 1981 is 400 (1,500 for the Roehampton Institute).
Southlands is known for its concern for children with special needs and its pioneer work in multi-racial education.
Excellent qualifications in Education are required as well as successful teaching at various levels, including teacher education. Administrative experience would be an advantage. Candidates should state their specialist or particular interests.
Further particulars and application forms from the Principal, Miss M. P. Callard, B.Com. B.A. (Social Studies), Southlands College, Wimbledon Parkside, London, SW19 5NN (Tel. 01-446 2234).

JORDANHILL

COLLEGE OF EDUCATION / GLASGOW
The Governors invite applications for a **LECTURESHIP** concerned with the **B.ED. IN PHYSICAL EDUCATION**
This is a full appointment to the staff of the Scottish School of Physical Education, or may be a joint appointment with the School and either the College department of Education or Psychology. The person appointed will be involved in the teaching of the B.Ed. degree in Physical Education validated by the CNA, and consideration will be given to candidates qualified to contribute to any of the following areas:—
(a) Recreation Management
(b) Dance and Aesthetics
(c) Research Based Learning
(d) The Education of the Disadvantaged
(e) Educational Psychology
(f) Psychological aspects of Guidance
If the appointment is made to the staff of SSE, the successful candidate will be required to have a professional qualification in Physical Education. If it is a joint appointment he or she will be required to have a professional qualification in Psychology or Education. The person appointed will be expected to make a major contribution to the quality of schools in the west of Scotland.
Candidates have to be fully registered teachers or eligible for full registration with the General Teaching Council. Other things being equal, preference would be given to candidates with the ability to contribute to practical work in Physical Education.
The salary scale for this post is: £3,216 to £5,495, with 15 points and increments of approximately £200 each. The point at which the successful applicant will be placed on the scale will be determined in relation to his or her salary at the time of appointment. Further particulars and application forms should be obtained from THE PRINCIPAL, JORDANHILL COLLEGE OF EDUCATION, SOUTH-BRAE DRIVE, GLASGOW G13 1PF. Completed forms should be returned not later than Friday, 27th February, 1976.

JORDANHILL

COLLEGE OF EDUCATION / GLASGOW
The Governors invite applications for the post of **HEAD of the ENGLISH DEPARTMENT**
which is becoming vacant because of the retirement of the present occupant, the person appointed will be responsible for the training of graduate teachers of English for the secondary schools, for B.Ed. classes at the Ordinary and Higher Levels, and for courses in English for primary teachers. The number of students working in the department in any year is likely to be over 1,000, and the person appointed will have an opportunity to make a major contribution to the quality of schools in the west of Scotland.
Candidates should possess an Honours Degree in English and should be fully trained teachers with considerable experience of work in schools. It would be an advantage to have in addition experience of the training of English teachers. The salary for the post will be £3,100 per annum and the appointment will date from 1st September 1976.
Further particulars and forms of application may be obtained from THE PRINCIPAL, JORDANHILL COLLEGE OF EDUCATION, SOUTH-BRAE DRIVE, GLASGOW G13 1PF. Completed forms should be returned not later than Monday, 23rd February, 1976.

HERTFORDSHIRE COUNTY COUNCIL

HERTFORDSHIRE COLLEGE OF BUILDING
ST. ALBANS
Applications are invited for the post of **Principal**
of the College which will become vacant on 1 September, 1976, on the retirement of the present Principal, Mr. N. Parker, OBE.
The College, which is the County centre for all education related to the construction industry, offers a considerable range of courses in this field and attracts students from a wide area. Applicants for the post should be well qualified as graduates or graduates equivalent level. They should have had good experience in the construction industry or in an allied profession, together with substantial related educational experience including the exercise of administrative responsibility. The salary group under the current Burnham Further Education Survey is A.
Further details are available from the County Education Officer (Ref. GHM), County Hall, Hertford SG13 8DE, to whom applications should be submitted by 20 February 1976.

HERTFORDSHIRE COUNTY COUNCIL

HERTFORDSHIRE COLLEGE OF BUILDING
ST. ALBANS
Applications are invited for the post of **Principal**
of the College which will become vacant on 1 September, 1976, on the retirement of the present Principal, Mr. N. Parker, OBE.
The College, which is the County centre for all education related to the construction industry, offers a considerable range of courses in this field and attracts students from a wide area. Applicants for the post should be well qualified as graduates or graduates equivalent level. They should have had good experience in the construction industry or in an allied profession, together with substantial related educational experience including the exercise of administrative responsibility. The salary group under the current Burnham Further Education Survey is A.
Further details are available from the County Education Officer (Ref. GHM), County Hall, Hertford SG13 8DE, to whom applications should be submitted by 20 February 1976.

KINGSTON POLYTECHNIC STUDENTS' UNION

ADMINISTRATIVE OFFICER
to commence employment May 1, 1976. The successful candidate for this post would be expected to have a good working knowledge of accounting, and have the capacity to handle staff as well as a sympathetic understanding of the student situation. For further details and application form write to the President, Kingston Polytechnic Students' Union, Penrhyn Road, Kingston upon Thames, Surrey. Closing date for application February 27, 1976. Salary subject to negotiation, approximately local government A4 scale.

LONDON

THE UNIVERSITY
COLLEGE HALL
WARDEN
Applications are invited from qualified institutions for the post of Warden of College Hall, which is vacant on 1st September 1976.
The Hall is situated in Malet Street, W.C.2 and has accommodation for 100 students. The post requires a full-time postgraduate student with a minimum of two years' experience in the management of a large institution. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, College Hall, London.

THE UNIVERSITY
COLLEGE HALL
WARDEN
Applications are invited from qualified institutions for the post of Warden of College Hall, which is vacant on 1st September 1976.
The Hall is situated in Malet Street, W.C.2 and has accommodation for 100 students. The post requires a full-time postgraduate student with a minimum of two years' experience in the management of a large institution. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, College Hall, London.

SHEFFIELD

THE UNIVERSITY
COLLEGE HALL
WARDEN
Applications are invited from qualified institutions for the post of Warden of College Hall, which is vacant on 1st September 1976.
The Hall is situated in Malet Street, W.C.2 and has accommodation for 100 students. The post requires a full-time postgraduate student with a minimum of two years' experience in the management of a large institution. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, College Hall, London.

SHEFFIELD

THE UNIVERSITY
COLLEGE HALL
WARDEN
Applications are invited from qualified institutions for the post of Warden of College Hall, which is vacant on 1st September 1976.
The Hall is situated in Malet Street, W.C.2 and has accommodation for 100 students. The post requires a full-time postgraduate student with a minimum of two years' experience in the management of a large institution. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, College Hall, London.

SHEFFIELD

THE UNIVERSITY
COLLEGE HALL
WARDEN
Applications are invited from qualified institutions for the post of Warden of College Hall, which is vacant on 1st September 1976.
The Hall is situated in Malet Street, W.C.2 and has accommodation for 100 students. The post requires a full-time postgraduate student with a minimum of two years' experience in the management of a large institution. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, College Hall, London.

SHEFFIELD

THE UNIVERSITY
COLLEGE HALL
WARDEN
Applications are invited from qualified institutions for the post of Warden of College Hall, which is vacant on 1st September 1976.
The Hall is situated in Malet Street, W.C.2 and has accommodation for 100 students. The post requires a full-time postgraduate student with a minimum of two years' experience in the management of a large institution. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, College Hall, London.

SHEFFIELD

THE UNIVERSITY
COLLEGE HALL
WARDEN
Applications are invited from qualified institutions for the post of Warden of College Hall, which is vacant on 1st September 1976.
The Hall is situated in Malet Street, W.C.2 and has accommodation for 100 students. The post requires a full-time postgraduate student with a minimum of two years' experience in the management of a large institution. The salary is £12,000 per annum, plus a house allowance of £1,000. The closing date is 15th March 1976. Applications should be sent to the Director of Education, College Hall, London.

Administration

WORKERS' EDUCATIONAL ASSOCIATION
Applications are invited for a new post of **Administrative Officer** in the office of the Director of Education, Doncaster. The post holder will be responsible for the administration of the Association and will be required to have a minimum of five years' experience in a similar post. Salary scale: £3,278-£5,493. Applications should be sent to the Principal, Doncaster College of Education, Doncaster, to whom completed forms should be returned by 23rd February, 1976.

Awards

LONDON
THE UNIVERSITY COLLEGE LONDON is seeking applications for a **Post-graduate Fellow** in the Department of Social Sciences. The post holder will be responsible for the administration of the Department and will be required to have a minimum of five years' experience in a similar post. Salary scale: £3,278-£5,493. Applications should be sent to the Principal, Doncaster College of Education, Doncaster, to whom completed forms should be returned by 23rd February, 1976.

MANCHESTER
THE UNIVERSITY OF MANCHESTER is seeking applications for a **Post-graduate Fellow** in the Department of Social Sciences. The post holder will be responsible for the administration of the Department and will be required to have a minimum of five years' experience in a similar post. Salary scale: £3,278-£5,493. Applications should be sent to the Principal, Doncaster College of Education, Doncaster, to whom completed forms should be returned by 23rd February, 1976.

Colleges of Higher Education

DONCASTER LOCAL EDUCATION AUTHORITY
DONCASTER METROPOLITAN INSTITUTE OF HIGHER EDUCATION
Appointment of Deputy Principal Group 10

Applications are invited from persons with appropriate qualifications and experience for the post of Deputy Principal of Doncaster Metropolitan Institute of Higher Education which will be formed on the amalgamation in September, 1976, of Doncaster College of Art, Doncaster College of Education, Doncaster College of Technology (including the former Mexborough College of Further Education) and Scarsby College of Education. Applicants should have high academic qualifications and substantial experience in the education service, including a significant background of work in Further Education. The new Institute will be placed in Group 10 and the salary will be £10,398 per annum. Application forms and further particulars may be obtained from the Director of Education, Education Department, Princegate, Doncaster, to whom completed forms should be returned by 23rd February, 1976.

Colleges of Further Education

Bournemouth College of Technology
Faculty of Humanities and Social Sciences

Law Lecturer (LII)
FOR 1st MAY 1976

An additional lecturer is sought to join a team of five lecturers teaching law as part of the B.A. Humanities (ONAA) Honours Degree course. Applications are invited from law graduates and/or those professionally qualified who are able to offer **LAND LAW AND EQUITY** (including the Law of Trusts), and should be forwarded to the Principal of the College prior to 14th February, 1976. Salary Scale: £3,278-£5,493, the commencing point depending on qualifications and experience. Application forms and details from: The Principal, College of Technology, Lansdowne, Bournemouth, BH1 3AJ. Telephone (0202) 20844.

General Vacancies

Re-advertisement
Greater London Arts Association
Appointment of Director

Salary negotiable, but expected to be between £7,500 and £10,000. Further particulars may be obtained by writing, quoting ref. RA2/H, to: The Correspondent, Greater London Arts Association, 25/51 Tavolock Place, London WC1H 9BB. Closing date for full applications February 27/1976.

COLLEGE OF ESTATE MANAGEMENT
Centre for Advanced Land Use Studies
A challenging opportunity exists for a suitably experienced person to contribute to the Centre's work in **POST-QUALIFICATION EDUCATION AND TRAINING**. The Centre's activities in this area are expanding and the post, which is a senior one, calls for someone with imagination and initiative who is prepared to make a positive contribution to the planning and management of an extensive programme of professional and technical education and training. Salary scale: £3,780-£5,418. Further details and application forms from the Secretary, College of Estate Management, Whiteknights, Reading RG2 2AW. Tel. (0734) 881101. Closing date for applications: 5 March, 1976.

LONDON
UNIVERSITY OF LONDON
KING'S COLLEGE
TELEVISION UNIT
TELEVISION MANAGER
A Manager (main or female) is required for the Television Unit, which is a part of the University of London. The post holder will be responsible for the management of the Unit and will be required to have a minimum of five years' experience in a similar post. Salary scale: £3,278-£5,493. Applications should be sent to the Principal, Doncaster College of Education, Doncaster, to whom completed forms should be returned by 23rd February, 1976.

Colleges of Technology

Lancashire County Council
Blackpool College of Technology and Art
Re-advertisement
HEAD OF ART (Grade V)
Details of this September vacancy available from the Principal, Ashfield Road, Blispham, Blackpool, Lancashire.

Courses

UNIVERSITY OF LEICESTER
School of Social Work
ADVANCED M.A. COURSE
in the
THERAPEUTIC ASPECTS OF SOCIAL WORK
Applications are invited for this new course of instruction commencing in October, 1976. It is intended for postgraduate students who wish to extend their knowledge of the theoretical, empirical, ethical and clinical bases for the treatment of psychological problems in social work practice. Full-time students can complete the course in one year, and part-time students in two years. The latter will attend the University for one and a half days in each week during term-time. Further particulars and application forms from: Professor Peter H. M. Pinner, School of Social Work, University of Leicester, LE1 7RH. Tel. (0533) 433111. Closing date for applications: 15 February, 1976.

REMINDER
The Times Higher Education Supplement by the Friday prior to publication for advertisement and by the Friday prior to publication for advertisement and by the Friday prior to publication for advertisement.

Overseas

LIBYAN ARAB REPUBLIC
UNIVERSITY OF TRIPOLI
LECTURER
ASSISTANT PROFESSOR
ASSOCIATED PROFESSOR
PROFESSOR
Applications are invited for positions to teach fundamentals of Computer Science to undergraduates, mainly. Preference will be given to people specialised in one or more of the following fields:
Data Processing **Information Systems**
Data Structures **Programming**
Languages **Operating Systems**
Applicants should have a Ph.D. in Computer Science or related fields. Preference will be given to applicants with teaching experience.
Salary (Libyan Dinars) **From To**
Lecturer 3200 4000
Assistant Professor 3800 5000
Associated Professor 4200 5500
Professor 4800 5800
Allowances (Libyan Dinars) **Accommodation** **Furniture**
Married 1200 2 Months Salary
Single 840 1 Month's Salary
(1 Libyan Dinar = £1.80 App.)
Applications to be sent to the following address not later than 30th March, 1976.
Head of Mathematics & Science Department
University of Tripoli, P.O. Box 688,
Tripoli, Libyan Arab Republic

Holidays and Accommodation
THE 15 DAY
QUINCY ARCHAROLPH
LECTURE TOWN OF ISRAEL
Departures 30th March, 14th April, 14th May, 14th June, 14th July, 14th August, 14th September, 14th October, 14th November, 14th December. Tel. 01-243 3506

THE NEW SOUTH WALES
INSTITUTE OF TECHNOLOGY
SYDNEY, AUSTRALIA
FACULTY OF BUSINESS STUDIES
The New South Wales Institute of Technology provides at its central city campus a wide range of professional courses for those entering or already employed in Business, Government and Technical fields. The Faculty of Business Studies (School of Business) is currently the largest and most dynamic of the Institute's faculties. It is presently adding additional academic staff to teach in the Undergraduate programmes that are currently the mainstay of the Faculty. A new multi-storey Business Studies building will commence construction in the near future.
SENIOR LECTURER IN ACCOUNTING
\$A16,512-\$19,193 (P8tg 10,204-11,861 approx.)
Applicants should possess a Higher Degree with major strength in Accounting and an interest in Financial Accounting, External Reporting Issues and Accounting Theory. Considerable experience in Professional Accounting in Business and/or Government and lecturing in a university or equivalent institution is essential. The person appointed will be expected to accept responsibility in developing subject matter for existing and new courses and some other duties associated with the administration of the School of Accounting. The position normally provides for tenure, study leave and superannuation benefits. Housing loans are available. Fare and a contribution toward removal and initial accommodation expenses are provided for overseas appointees. Applications, closed on 31st March, 1976. Applicants should arrange for three confidential referees' reports to arrive by the same date. Applications and referees' reports should be sent to:
The Agent-General for New South Wales
New South Wales Government Offices
88 The Strand
Sydney NSW 2000, AUSTRALIA
Tel. (02) 22 1455 (ext. 274)

THE NEW SOUTH WALES
INSTITUTE OF TECHNOLOGY
SYDNEY, AUSTRALIA
FACULTY OF BUSINESS STUDIES

PRINCIPAL LECTURER/SENIOR LECTURER IN WELFARE STUDIES
The successful applicant will be required to lead and coordinate a new associate diploma course in Welfare Studies which has been approved to commence in 1978. It is anticipated that the applicant will have a minimum of five years' experience in a similar post. Salary scale: £3,278-£5,493. Applications should be sent to the Principal, Doncaster College of Education, Doncaster, to whom completed forms should be returned by 23rd February, 1976.

University of Trondheim
Institute of Technology
Applications are invited for
LECTURER IN ENGLISH
at the above institution. Duties will include:
(a) the teaching of technical English and remedial language work;
(b) counselling, and
(c) English language consultancy.
Applicants should be native speakers with a background in either:
(a) Science, engineering or technical writing, or
(b) arts graduates with postgraduate linguistic qualifications in English for special purposes, or technical English.
The position is subject to an annual contract which may be renewable. The successful applicant should ideally be prepared to take up the position by 1 June, 1976, and in any case not later than 1 August, 1976. A knowledge of Norwegian is not essential, but would be an advantage.
Applicants should forward a full curriculum vitae to the address below by the 27th February, 1976. The position provides for study leave and tenure. A Housing Loan Scheme is also available. Fare and a contribution toward removal and initial accommodation expenses are provided for overseas appointees.
Applications close on 27th February, 1976. Applicants should arrange for three confidential referees' reports and transcripts of academic qualifications to arrive by the same date. Applications, transcripts and referees' reports are to be sent to:
The Agent-General for New South Wales
New South Wales Government Offices
88 The Strand
Sydney NSW 2000, AUSTRALIA
Tel. (02) 22 1455 (ext. 274)

Glostrand Institute of Advanced Education
P.O. Box 42, Churchill, Victoria, Australia 3642.
(Phone Churchill) (061) 22 1455 (ext. 274)

Western Australian Institute of Technology

The Institute is a major, degree awarding college of advanced education with a student enrolment in excess of 10,000 and has the following vacancies.

HEAD OF DEPARTMENT, PSYCHOLOGY
In January, 1976, two new academic departments were created in the School of Social Sciences by the division of the existing Department of Psychology and Social Work into its constituent parts. The Department of Psychology offers a three year undergraduate Bachelor of Applied Science course in Psychology and a one year Graduate Diploma course in Psychology. Plans are being formulated to develop a Masters degree programme.

HEAD OF DEPARTMENT, SOCIAL WORK
The Department of Social Work is responsible for a four year undergraduate programme leading to the award of the degree of Bachelor of Applied Science in Social Work. Future developments under consideration are a two year undergraduate course in welfare studies, a Graduate Diploma in Community Work and a Masters degree programme.

HEAD OF DEPARTMENT, PHYSIOTHERAPY
The Department of Physiotherapy is a newly created department, established in January, 1976, prior to which the courses were conducted by the Department of Therapy. The Department of Physiotherapy is responsible for three courses of study: the Bachelor of Applied Science, Physiotherapy; Diploma of Chiropody and the Graduate Diploma in Manipulative Therapy.

HEAD OF DEPARTMENT, BUSINESS LAW AND ECONOMICS
The Department of Business Law and Economics conducts subjects in the areas of Business Law, Economics and Real Estate Valuation. It is responsible for the Secretarial Administration option of the Bachelor of Business degree; the Associate Diploma of Valuation, and subjects examined on behalf of the Institute of Chartered Secretaries and Administrators.

DUTIES
Each head of Department will be concerned with the leadership of a team of skilled specialists and will be expected to make an individual contribution in the light of the needs of the team, the Institute and personal aptitudes.

SALARY: (at the present rate of exchange) £UK 12,934. Salaries are payable in Australian dollars.
QUALIFICATIONS: Applicants are expected to have suitable academic qualifications and be members of an appropriate professional institution, where applicable. Administrative experience is desirable.
TENURE: Appointment may be either permanent or for a short-term period. Short-term contracts will be negotiated to suit individual requirements.
CONDITIONS: Assistance with fares for family and removal expenses are payable to appointees. Conditions of service for permanent staff include superannuation (similar to FRSU), six weeks annual leave plus public holidays, three months long service leave on completion of each seven years service, sick leave and assisted study leave.
APPLICATIONS: Applicants should state of their preference for permanent or short-term appointment. Detailed applications, including a curriculum vitae and names of three referees should be submitted not later than February 27, 1976, to the Migration Liaison Officer, Western Australia House, 115, Strand, London WC2R 0AJ. Further particulars may be obtained from the above address. When applying please quote Ref. No. HE 6.

University of Trondheim
Institute of Technology
Applications are invited for
LECTURER IN ENGLISH
at the above institution. Duties will include:
(a) the teaching of technical English and remedial language work;
(b) counselling, and
(c) English language consultancy.
Applicants should be native speakers with a background in either:
(a) Science, engineering or technical writing, or
(b) arts graduates with postgraduate linguistic qualifications in English for special purposes, or technical English.
The position is subject to an annual contract which may be renewable. The successful applicant should ideally be prepared to take up the position by 1 June, 1976, and in any case not later than 1 August, 1976. A knowledge of Norwegian is not essential, but would be an advantage.
Applicants should forward a full curriculum vitae to the address below by the 27th February, 1976. The position provides for study leave and tenure. A Housing Loan Scheme is also available. Fare and a contribution toward removal and initial accommodation expenses are provided for overseas appointees.
Applications close on 27th February, 1976. Applicants should arrange for three confidential referees' reports and transcripts of academic qualifications to arrive by the same date. Applications, transcripts and referees' reports are to be sent to:
The Agent-General for New South Wales
New South Wales Government Offices
88 The Strand
Sydney NSW 2000, AUSTRALIA
Tel. (02) 22 1455 (ext. 274)

University of Trondheim
Institute of Technology
Applications are invited for
LECTURER IN ENGLISH
at the above institution. Duties will include:
(a) the teaching of technical English and remedial language work;
(b) counselling, and
(c) English language consultancy.
Applicants should be native speakers with a background in either:
(a) Science, engineering or technical writing, or
(b) arts graduates with postgraduate linguistic qualifications in English for special purposes, or technical English.
The position is subject to an annual contract which may be renewable. The successful applicant should ideally be prepared to take up the position by 1 June, 1976, and in any case not later than 1 August, 1976. A knowledge of Norwegian is not essential, but would be an advantage.
Applicants should forward a full curriculum vitae to the address below by the 27th February, 1976. The position provides for study leave and tenure. A Housing Loan Scheme is also available. Fare and a contribution toward removal and initial accommodation expenses are provided for overseas appointees.
Applications close on 27th February, 1976. Applicants should arrange for three confidential referees' reports and transcripts of academic qualifications to arrive by the same date. Applications, transcripts and referees' reports are to be sent to:
The Agent-General for New South Wales
New South Wales Government Offices
88 The Strand
Sydney NSW 2000, AUSTRALIA
Tel. (02) 22 1455 (ext. 274)

University of Trondheim
Institute of Technology
Applications are invited for
LECTURER IN ENGLISH
at the above institution. Duties will include:
(a) the teaching of technical English and remedial language work;
(b) counselling, and
(c) English language consultancy.
Applicants should be native speakers with a background in either:
(a) Science, engineering or technical writing, or
(b) arts graduates with postgraduate linguistic qualifications in English for special purposes, or technical English.
The position is subject to an annual contract which may be renewable. The successful applicant should ideally be prepared to take up the position by 1 June, 1976, and in any case not later than 1 August, 1976. A knowledge of Norwegian is not essential, but would be an advantage.
Applicants should forward a full curriculum vitae to the address below by the 27th February, 1976. The position provides for study leave and tenure. A Housing Loan Scheme is also available. Fare and a contribution toward removal and initial accommodation expenses are provided for overseas appointees.
Applications close on 27th February, 1976. Applicants should arrange for three confidential referees' reports and transcripts of academic qualifications to arrive by the same date. Applications, transcripts and referees' reports are to be sent to:
The Agent-General for New South Wales
New South Wales Government Offices
88 The Strand
Sydney NSW 2000, AUSTRALIA
Tel. (02) 22 1455 (ext. 274)

Glostrand Institute of Advanced Education
P.O. Box 42, Churchill, Victoria, Australia 3642.
(Phone Churchill) (061) 22 1455 (ext. 274)

KUWAIT

UNIVERSITY OF KUWAIT

FACULTY OF MEDICINE

Applications are invited for the following foundation posts in the Faculty of Medicine which is opening in September, 1976, with an intake of 40 pre-medical students. Pre-clinical teaching will commence in September, 1978. Until the completion of a 600-bed University Hospital and Medical School complex in 1980, the Medical School will be housed in temporary accommodation fully equipped with research and teaching facilities. Instruction will be in English. Successful applicants will be involved in the planning and development of the curriculum and assessment system, and in the establishment of scientific research programmes. All these posts are tenable from the 1st of September, 1976, onwards.

BIOCHEMISTRY
Professors or Assistant Professors or Lecturers 2 posts.
COMMUNITY HEALTH AND BEHAVIOURAL SCIENCE
Professors or Assistant Professors or Lecturers 3 posts.
HUMAN MORPHOLOGY AND EXPERIMENTAL PATHOLOGY
Professors or Assistant Professors or Lecturers 5 posts.
MICROBIOLOGY
Professors or Assistant Professors or Lecturers 2 posts.
PHARMACOLOGY
Professors or Assistant Professors or Lecturers 3 posts.
PHYSIOLOGY
Professors or Assistant Professors or Lecturers 2 posts.

General Conditions for Appointment
Qualifications: All applicants must possess a Ph.D. degree or an equivalent qualification and have conducted and published research in his or her field. Professors should have 14 years' experience, as an Assistant Professor or its equivalent, i.e. Senior Lecturer or Reader, Assistant Professors should have 8 years' experience, 4 as a Lecturer. Lecturers should have 4 years' experience. Contracts: Two to four years, renewable contracts are negotiable. Salary Scales (monthly in Kuwaiti Dinars) 1 KD=£1,800 approx. Professors—\$60,420 (8 increments) and an additional 40 per cent of salary as a professional allowance, (70 per cent of basic salary if there is a clinical commitment). Assistant Professors—\$30,360 (8 increments) and an additional 40 per cent of salary as a professional allowance, (60 per cent of basic salary if there is a clinical commitment). Lecturers—\$24,300 (8 increments) and an additional 40 per cent of salary as a professional allowance, (60 per cent of basic salary if there is a clinical commitment). In addition there is a monthly car allowance of \$30 KD for Professors and Assistant Professors and \$25 KD for Lecturers. There is also an inflation allowance of 75 KD for all grades of academic staff. Further details can be obtained from the Dean, Faculty of Medicine, Kuwait University, P.O. Box No. 5889, Kuwait, who should receive completed applications naming 3 referees, together with detailed curriculum vitae, no later than 22nd March, 1976. Information about Kuwait can be obtained from the Kuwait Embassy, Cultural Attache's Office, 5 Stratford Place, London W1N 8AE. Tel: 01-629 6855.

THE NEW SOUTH WALES
INSTITUTE OF TECHNOLOGY
SYDNEY, AUSTRALIA
ASSOCIATE HEAD OF THE SCHOOL OF BUSINESS ADMINISTRATION
\$A24,364 (Paig 15,102 approx.)

The New South Wales Institute of Technology provides at its central city campus in Sydney a wide range of professional courses for those entering or already employed in business, government, and technological fields. A new multi-storey Business Studies Building to house the four separate schools of the Faculty will commence construction in the near future. The Associate Head of the School attracts a full Professor's salary and carries with it a normal teaching load of 3.5 semester hours plus responsibility for a certain amount of administrative activities within the School as assigned by the Head of the School. The teaching responsibilities will probably include such subjects as Business Policy, Business Simulation, Organisation Theory, and Principles of Management. The School offers core subjects to all students taking the Bachelor of Business Degree, concentration subjects for the two fields of Operations Management and Public Administration, and is responsible for the final grading subjects at the end of the Degree which are Business Policy and Business Simulation. The appointee must possess a D.B.A. or Ph.D. with previous experience teaching and administering in a School of Business Administration. It is desirable that the Associate Head of the School will have had business experience or experience as a Consultant to business or to government. Academic staff are encouraged to undertake limited professional consulting for industry and commerce. Opportunities for research work are available. The appointment will be effective from June 1978. The position provides for superannuation, study leave and tenure. A Housing Loan Scheme is also available. Fare and a contribution toward removal and initial accommodation expenses are provided for overseas appointees. Applications close on 27th February, 1976. Applicants should arrange for three confidential referees' reports and transcripts of academic qualifications to arrive by the same date. Applications, transcripts and referees' reports are to be sent to:
The Agent-General for New South Wales
New South Wales Government Offices
88 The Strand
Sydney NSW 2000, AUSTRALIA
Tel. (02) 22 1455 (ext. 274)

The next
'Review of New Courses'
feature
will be on the
27th February, 1976

For further
information and
details of
advertising
please contact:
CHARLOTTE COULSON
on 01-837 1234
extension 575